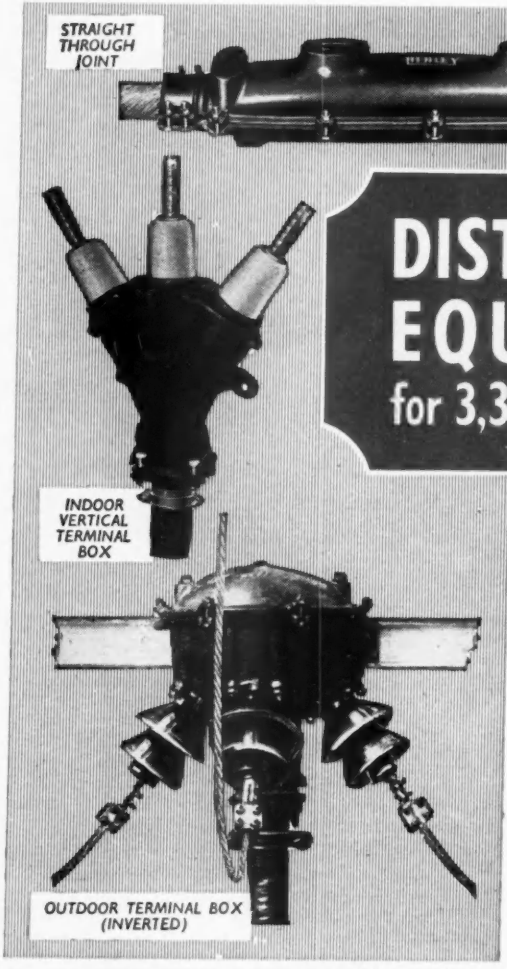
# ELECTRICAL TIMES

THURSDAY
12 JUNE
1952
NINEPENCE



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For indoor and outdoor installations at working pressures of 3,300-11,000v. Fully described in the following HENLEY catalogues; copies free on request:

**31—Straight Through Joints**
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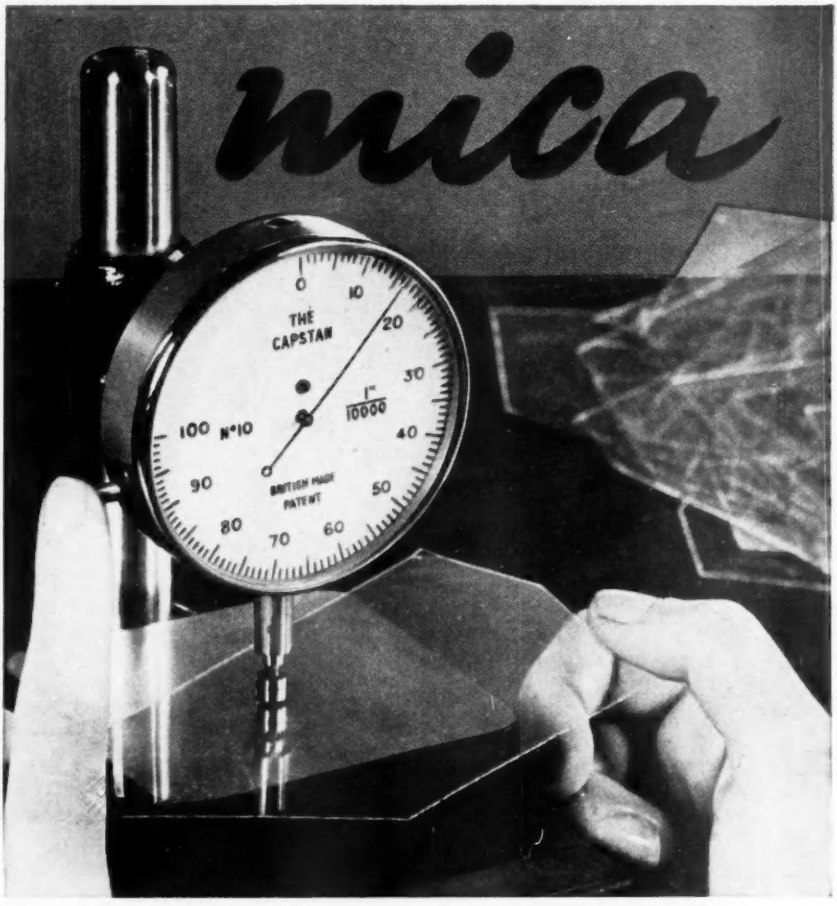


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For nearly 50 years we have been specialists in the preparation of:— ★ Commutator Segment Separators ★ Films for Capacitors ★ Heating Element Formers and Wound Elements ★ Stove Window Plates ★ Washers

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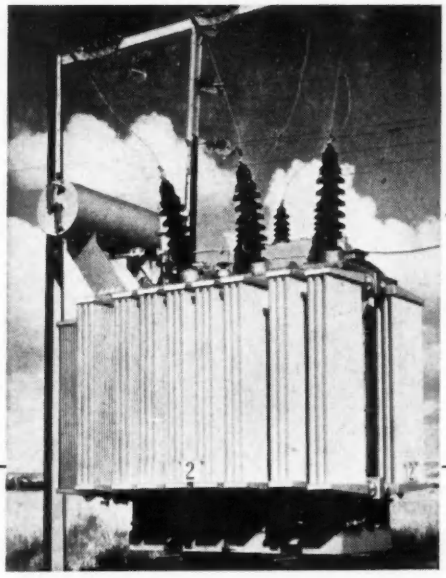

# *Twenty-eight transformers for South Australia*

Twenty-eight 12·5 MVA transformers are being supplied by 'ENGLISH ELECTRIC' to the Electricity Trust of South Australia as part of their development programme.
These transformers are three phase units with the main windings auto-connected for a voltage ratio of 66/33 kV.
A delta connected tertiary winding provides a supply at 7·6 kV; coupled to it is an inter-star balancer in the same tank.
The ENGLISH ELECTRIC Company has specialised for many years in the design and manufacture of transformers of all types up to the largest sizes and the highest voltages.

# 'ENGLISH ELECTRIC'
## transformers

THE ENGLISH ELECTRIC COMPANY LTD., Queens House, Kingsway, London, W.C.2
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WORKS: STAFFORD • PRESTON • RUGBY • BRADFORD • LIVERPOOL • ACCRINGTON
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## NEW PROJECTS - NETTLE LENDS A HAND

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***ARCHITECT:*** Leonard Reeves, Esq., Assoc.M.Inst.C.E., F.R.I.C.S., Borough Engineer & Surveyor.

***BUILT BY:*** Direct Labour.

***ELECTRICAL INSTALLATION:*** Messrs. J. H. Charlesworth & Son, Hightown, Crewe.

**NETTLE ACCESSORIES *Ltd.***

HARPER RD. WYTHENSHAWE MANCHESTER

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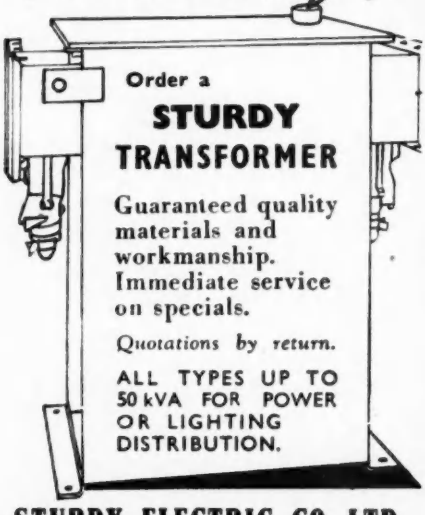

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**STURDY TRANSFORMER**

Guaranteed quality materials and workmanship. Immediate service on specials.

*Quotations by return.*

ALL TYPES UP TO 50 kVA FOR POWER OR LIGHTING DISTRIBUTION.

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IT IS A "CRESSALL-PRODUCT"

'CRESSALL' Back-of-Board Sliding Resistance with bevel wheel drive for fine regulation—with Hand-wheel and Dialplate for mounting.

**Sliding Resistances**

*for all purposes*

**"Cressall" Sliding Resistances are manufactured in an immense variety of types and sizes to meet every known requirement. Every "Cressall" resistance is of sound design and incorporates the best possible workmanship — yet prices are competitive.**

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TOWER STREET BIRMINGHAM 19
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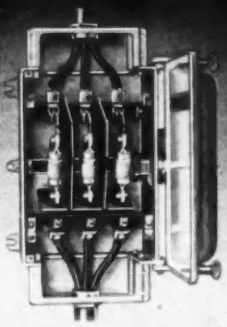
TELEGRAMS "OHMIC" BIRMINGHAM

*You cannot buy better gear*



**IMPERIAL FUSE SWITCHES.**

**46 M.V.A. SHORT CIRCUIT "MAKING" TESTS**

PREVIOUSLY TESTED AT 33 M.V.A. NOW SUCCESSFULLY TESTED AT 46 M.V.A. 440 VOLTS.

SIZES OF 30, 60, 100, 160, 200, 300 AND 500 AMPERES WERE TESTED AND ALL SWITCHES WERE FIT FOR NORMAL USE AFTER TESTS.

"ENGLISH ELECTRIC" CARTRIDGE FUSE LINKS WERE USED IN THESE FUSE SWITCHES.

FOR DETAILS OF IMPERIAL FUSE SWITCHES SEE PUBLICATION G551.

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From the small Table Cooker to the superb Streamline, Belling make a cooker for every kind of home and to suit every pocket.

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**LOOK OUT FOR THE NEW "WEE BABY BELLING"**

—a smaller version of the 'Baby Belling'—which does all the cooking for two or three people quickly and economically, and only costs £6.19.6. Watch for illustrations and more details next week.

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## and *'double-life'*

## fluorescent tubes

**Now available without restriction to all bona-fide re-sellers and users**

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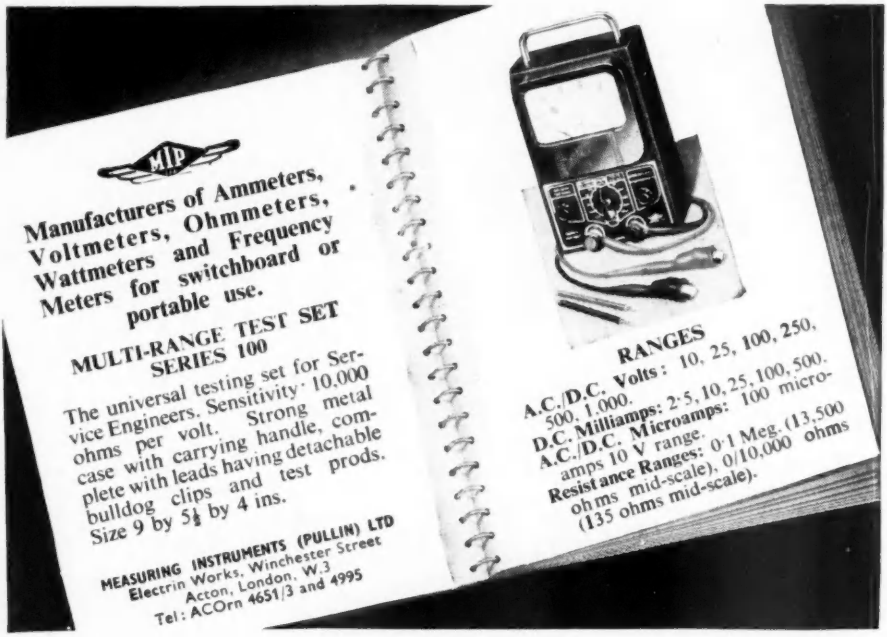
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The universal testing set for Service Engineers. Sensitivity: 10,000 ohms per volt. Strong metal case with carrying handle, complete with leads having detachable bulldog clips and test prods. Size 9 by 5⅛ by 4 ins.
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A.C./D.C. Volts: 10, 25, 100, 250, 500, 1,000.
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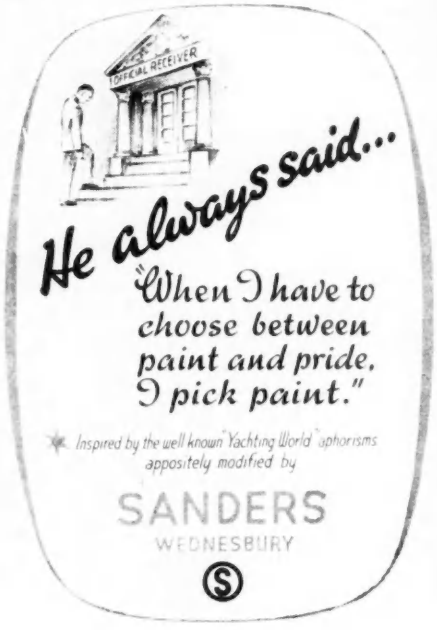
He always said...
"When I have to choose between paint and pride, I pick paint."
Inspired by the well known Yachting World aphorisms appositely modified by
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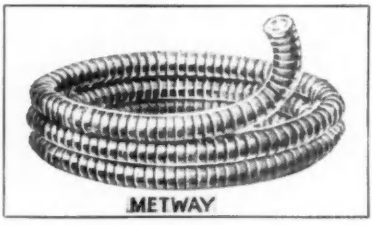
GALV. STEEL
**FLEXIBLE METALLIC TUBING**

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SIZES $\frac{3}{16}$ IN. TO 3 In. BORE

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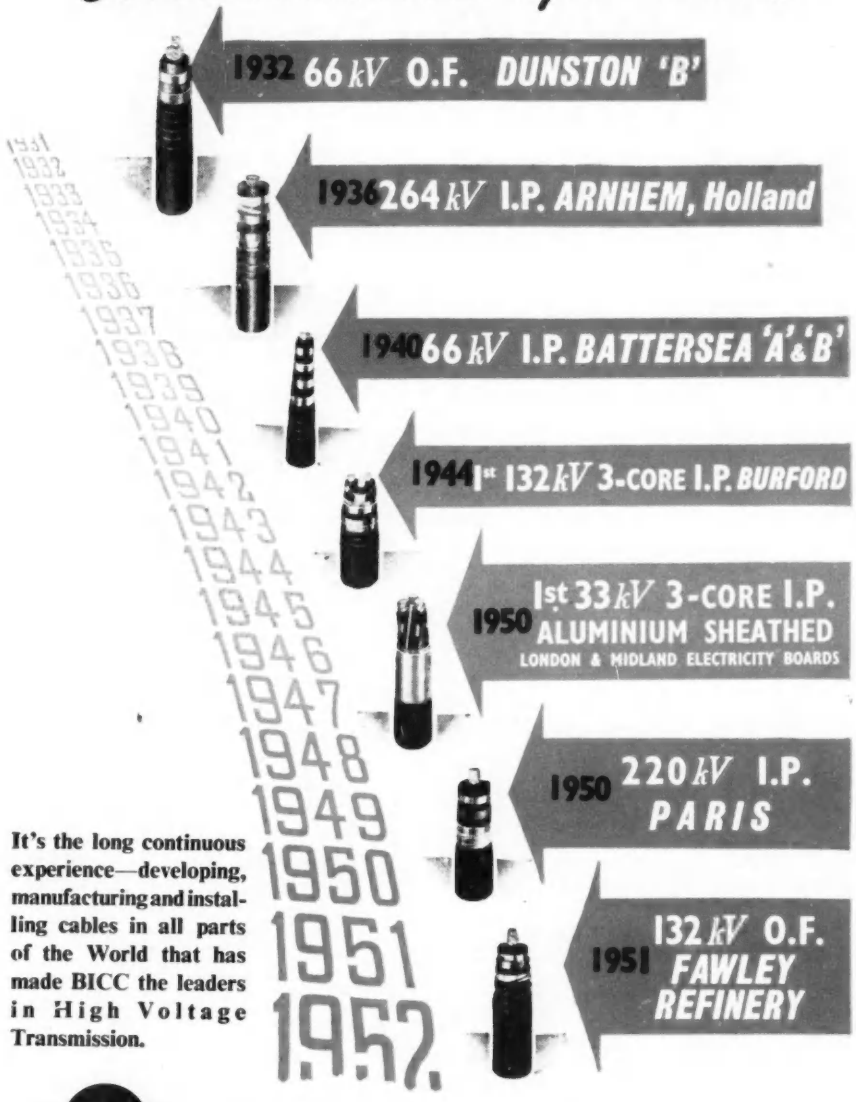
# *Continuous Experience*




**It's the long continuous experience—developing, manufacturing and installing cables in all parts of the World that has made BICC the leaders in High Voltage Transmission.**

B.I. Callender's

## HIGH VOLTAGE CABLES

BRITISH INSULATED CALLENDER'S CABLES LIMITED
NORFOLK HOUSE, NORFOLK STREET, LONDON, W.C.2

# AN ANNOUNCEMENT

OUR new ARC TRAP shortly to be introduced, is likely to create a marked interest in the sphere of oil circuit breaker technique. These developments are the product of intensive research and short circuit testing, much of which has been carried out at the KEMA Laboratories, Holland.

OVER the past years we resisted all persuasions to depart from a well balanced design of plain break oil circuit breaker in favour of the conventional arc control device. We were not disposed to ambody features which served largely as hydrostatic and insulating shields to enable the enclosure to be reduced in size and strength—relying entirely upon the adequate maintenance of the arc control device.

HAVING no wish to add just one more "arc control device" we directed our energies with marked success to the development of a definite Arc Trap, functioning on calculable and scientific lines and operating consistently with a level characteristic of arc duration at any fault capacity up to full rating. The fault current is transferred to the Arc Trap via external transfer contacts, which in themselves are capable of a reasonable short-circuit performance, quite apart from the efficacy of the Arc Trap.

THE ultimate possibilities of the Arc Trap are almost unlimited, but we have felt it desirable to confine its present application to our well known IVIO Metalclad Gear of 250 MVA ratings and above, in the knowledge that this gear has made its reputation in every form of service.

IN the development of the Arc Trap we can safely claim to have achieved:—

(a) A level characteristic of arc duration from 100% to 10% or under, i.e., no critical current.

(b) An average of approximately one cycle of arcing over this range.

(c) Arc suppression well within the Arc Trap at all currents—"cut off" usually at the first port.

(d) Short Opening Time with a total Break Time of approximately 5 cycles. 100% to 10%.

(e) Make and Latch at 100%—4 (a) Duty Cycle; retain closed after 2nd Make shot and follow immediately with 100% Breaks—4 (b) Duty Cycle.

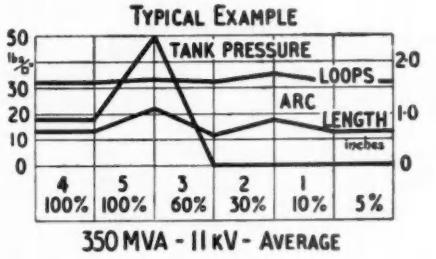
(f) Circuit Breaker manifestly capable of carrying rated load current after test.

(g) Arcing features entirely independent of load carrying contacts, such that burning of the arcing contacts effects no significant change in the contact resistance of the circuit breaker.

(h) Short circuit performance independent of the range of current ratings and dimensions of the main contacts.

THE range of circuit breakers fitted with Arc Traps already *certified* to B.S.116 and the ASTA interpretations thereof are:—

**250 MVA at 6.6 kV**
**250 MVA at 11 kV**
**350 MVA at 11 kV**
**250 MVA at 22 kV**
**500 MVA at 22 kV**




The Arc Trap is already the subject of Patent applications at home and abroad.

*More comprehensive literature is being prepared. Please advise us if you require a copy when it becomes available*

**YORKSHIRE SWITCHGEAR & ENGINEERING CO. LTD., LEEDS & LONDON**

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FOR EVERY PURPOSE

CREOSOTING
by Rueping Process

SCARFING

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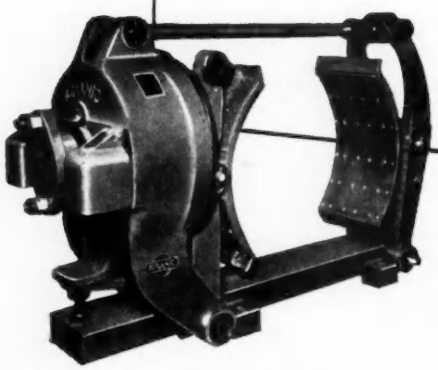
# IGRANIC
## MAGNETIC DEVICES.
## TYPE 'M' BRAKE.



FOR D.C SERVICE
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EMBODYING DIRECT ACTION
MECHANISM ELIMINATING ALL
TOGGLES

*For motors up to 350 h.p. using brake drums 8 ins. to 30 ins. diameter.*

### OUTSTANDING FEATURES

- Low head room.
- Bearings for hand release lever.
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- Nickel-Chrome steel bushes limit wear and lengthen life of bearings.
- Long bearings at all points assure years of service. Main bearings fitted with grease nipples.

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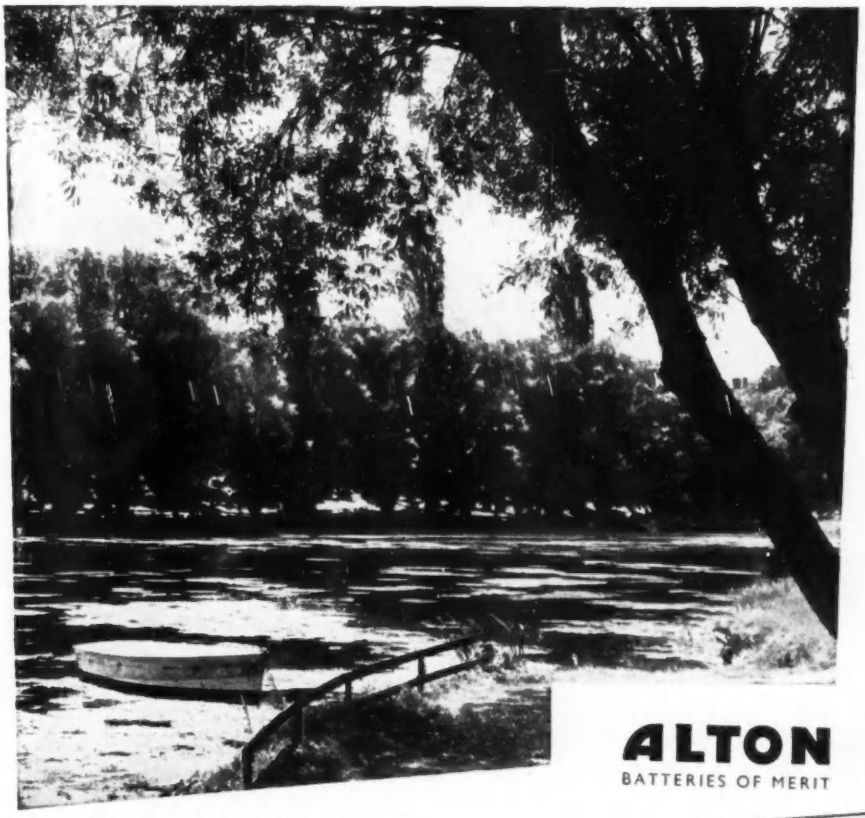
# This is King's pond—and its waters almost lap the bricks of the Alton Battery Works' south-west wall. It is part of the Company's property—a 5-acre asset in real estate. And a symbol of assets in wider terms than accountancy covers.

Alton is a country town—with a full, rounded, contented life of its own. A town where people have not yet changed to personnel. A town where families take root—and son follows father up to the Battery Works. A place where a man's proper pride in himself and his folk and the life he leads is reflected in doing things just that all-important bit better than 'up-to-specification.' And Alton batteries are made by Alton men.



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A24

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THE SURFACE SWITCH THAT LOOKS FLUSH

- **Contacts of silver rolled on copper**
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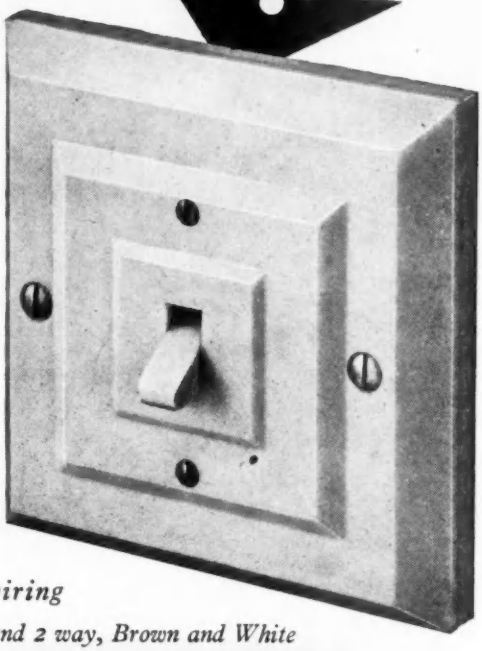
- **Long life far beyond requirements of B.S. 816**
- **Plus FALKS service and guarantee**



*but*

**NO** ...BLOCKS...SUNK BOXES ...DAMAGE TO WALLS

*when used with T.R.S. wiring*

*Made in 1 and 2 gang, 1 and 2 way, Brown and White*

**"SURFLUSH"**
**The surface switch that looks flush...**
*and cuts fixing costs*

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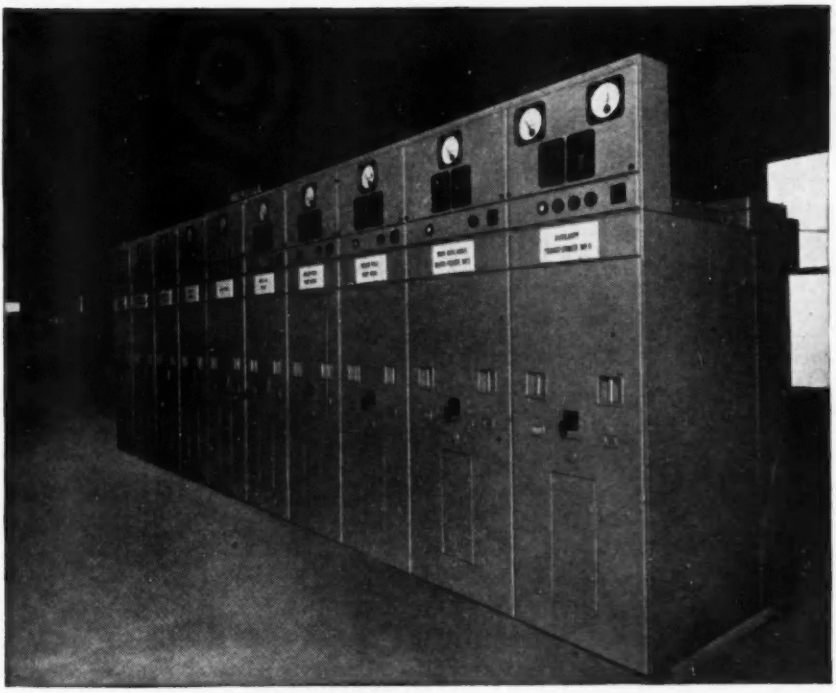
★ *If you want to talk switchgear . . . . talk to Reyrolle*



**AIR-BREAK SWITCHGEAR AT CLYDESMILL**

At Clydesmill Power Station, Reyrolle 150 MVA 3·3 kV air-break switchgear has been installed for controlling the power station auxiliaries. The panels are of air-insulated metal-enclosed construction with 150 MVA magnet-operated circuit-breakers. The circuit-breakers are isolated for maintenance and inspection on integral carriages and as they have easily removable arc-chutes, the whole contact assembly is readily examined. Particular care has been taken in designing the exterior and the result has been panels of neat and clean appearance.

*If you want to talk switchgear*

*A. Reyrolle & Company Ltd., Hebburn, Co. Durham.* *• • • talk to Reyrolle*

CRC 18S

THE NEW

# EKCO-ENSIGN

## Marketing Policy benefits all sections of the trade!

***Reduced Prices*** ● Fluorescent Lamp prices are substantially reduced.

***Increased Rebates*** ● In future, rebates will be calculated on the nett turnover of *all lighting products*, including Tungsten filament lamps, Fluorescent lamps, Fluorescent fittings, control gear and accessories, and Tungsten filament lamp Industrial and Commercial fittings.

*The above takes effect from 1st June 1952.*

***Favourable Discounts*** ● are maintained to the Trade.

***British Standards*** ● All Ekco Tungsten Filament Lamps conform to current British Standards.

*Details of all revised prices, including recent increases to certain lamps in the Tungsten Filament range, are given in our* ● *New comprehensive Price List available on request.*

**EKCO-ENSIGN ELECTRIC LTD.**

45, Essex Street, Strand, London, W.C.2. Phone—CITY 8951.

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**The Enfield Grid Suspension System is a new simplified method of overhead distribution eminently suitable for the electrification of farms. Steel cored cables and specially designed connection boxes are suspended on existing supports, thus effecting great saving in time, labour and expense. No conduit is necessary.**

***Our engineers will gladly plan the most favourable installation to suit your requirements.***

## THE ENFIELD
# GRID SUSPENSION SYSTEM

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Preference
REQUISITION TO PURCHASING DEPARTMENT
THE FOLLOWING INSTRUMENTS ARE REQUIRED URGENTLY
METERS ARON TYPE el
TEMPERATURE COMPENSATED
25 AMPS. 200/250 v. 50~
REASONS FOR PREFERENCE
The present el meter represents the result of 20 years' continuous research. During this period improvements have been made from time to time and, whilst retaining the proved basic design, further modifications have now been made to attain unparalleled performance under all conditions, the latest refinements are improved vernier adjustment and complete compensation for temperature changes.
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METERS
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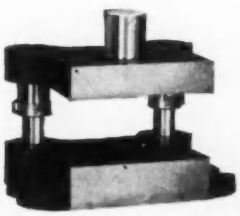
*When the captain stokes the boilers . . .*

. . . who commands the ship? The "Old Man" may be a dab hand with the shovel, but he hasn't earned the scrambled eggs on his cap for that. And *mutatis mutandis* (as the boxer said when he led with his right) the fact that a skilled toolmaker can make a perfect Press Tool Set does not mean that he should waste his time doing so. Each man to his job. The skipper to the bridge and the stoker to his fires; the toolmaker to his tools — and Desoutter, those eminent specialists, to the Press Tool Sets.

***It is quicker and cheaper to order your* PRESS TOOL SETS *from* Desoutter**



*Desoutter Bros. Ltd., The Hyde, Hendon, London, N.W.9. Tel: Colindale 6346 (5 lines). Grams: Despnuco, Hyde, London.*
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*For your new*
*Distribution Network*

**British Power transformers are available in a range of STANDARD sizes up to 500 kVA.**

THE POWER TRANSFORMERS OF PROVED RELIABILITY AND EFFICIENCY.

*Write for leaflet 207/6.*

**BRITISH POWER TRANSFORMER COMPANY LTD**

**Queensway, Ponders End, Middlesex**

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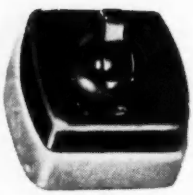
TUMBLER SWITCH

JUST  ONE

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**300 DIFFERENT**

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BAKELITE and PORCELAIN

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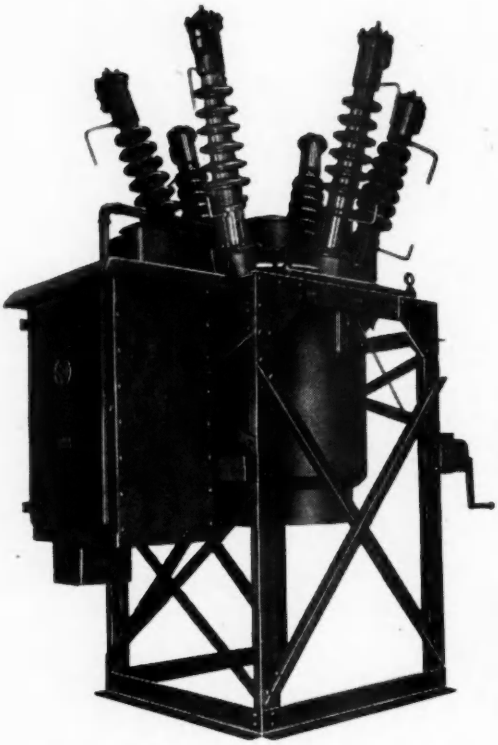

*Circuit Breakers of this type are now in service in various parts of the world*

*THE TYPE*

# ROP 54

## OIL CIRCUIT BREAKER

*for 66 kV service*

The ROP 54 Oil Circuit Breaker is being manufactured to meet the demand for a compact outdoor breaker for 66 kV service, and is the result of considerable experimental and development work carried out in recent years.

It complies in all respects with BS.116 and its short circuit rating has been certified by the Association of Short Circuit Testing Authorities.

To achieve compactness, all three phases are brought into one tank —a distinct advantage where considerations of space are of major importance.

*Removing a Contact from the Arc Control Device of the RO 54 Oil Circuit Breaker.*

*All components requiring periodical inspection are designed for easy removal.*

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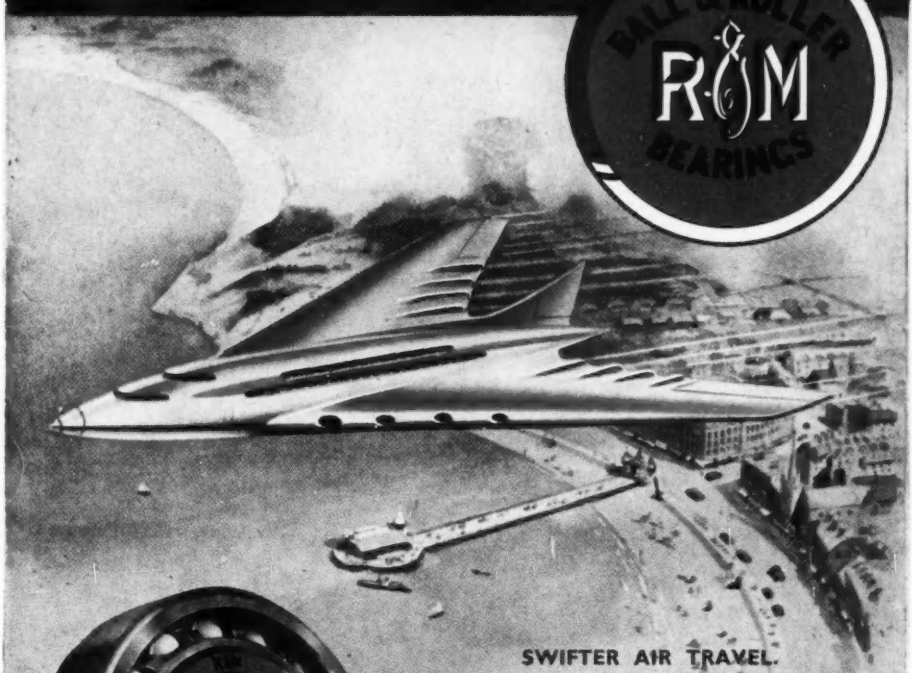

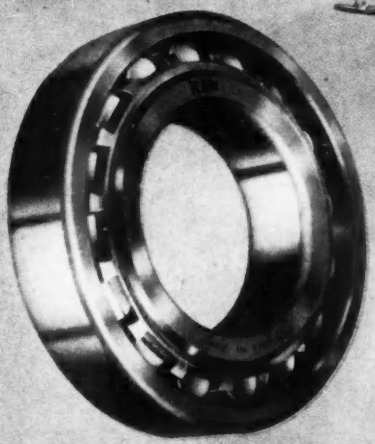

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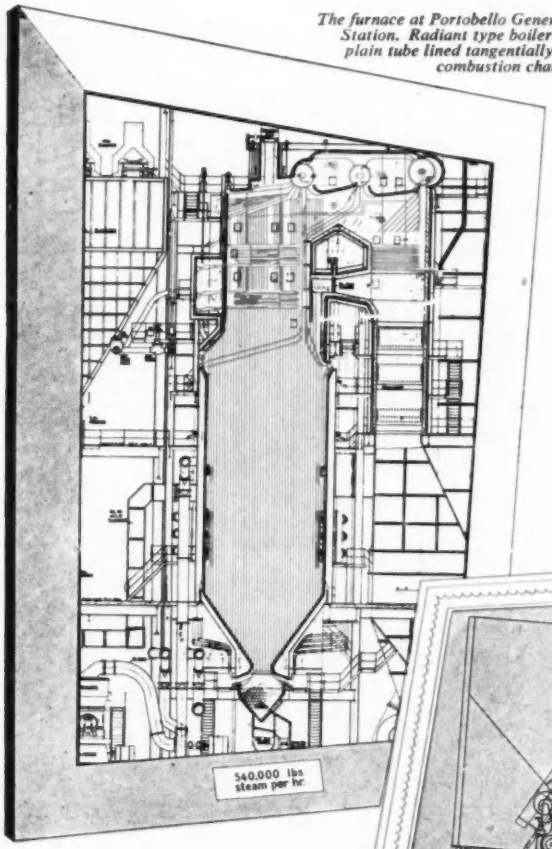
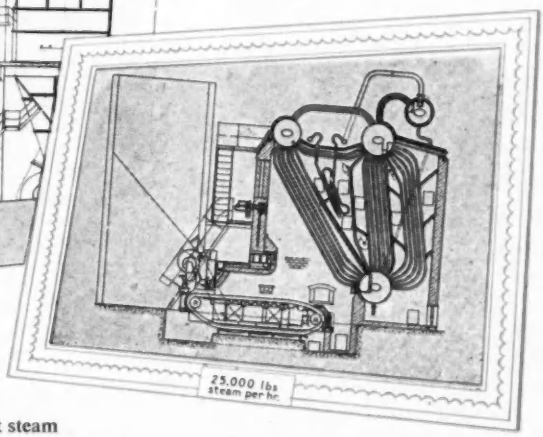



*The furnace at Portobello Generating Station. Radiant type boiler, with plain tube lined tangentially-fired combustion chamber.*

SG 18

# Different picture . . . same experience




The scene may vary but the creative spirit and experience remain the same. It is through the knowledge and advanced thinking of ICL engineers that steam generation plants like the one at Portobello, Edinburgh, came into being. Experience gained on great projects like this brings the benefits of economy and improved combustion to industrial users large and small. Today, ICL steam generating equipment — like the many other products of the organisation — is fulfilling the high trust placed in it all over the world.

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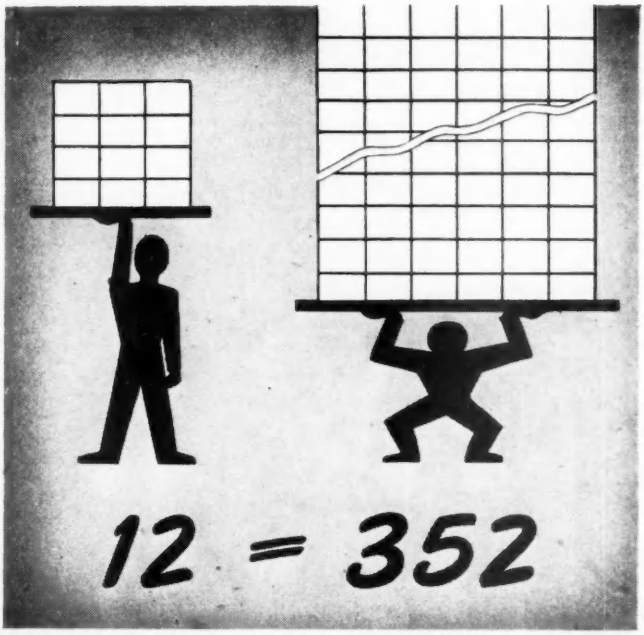


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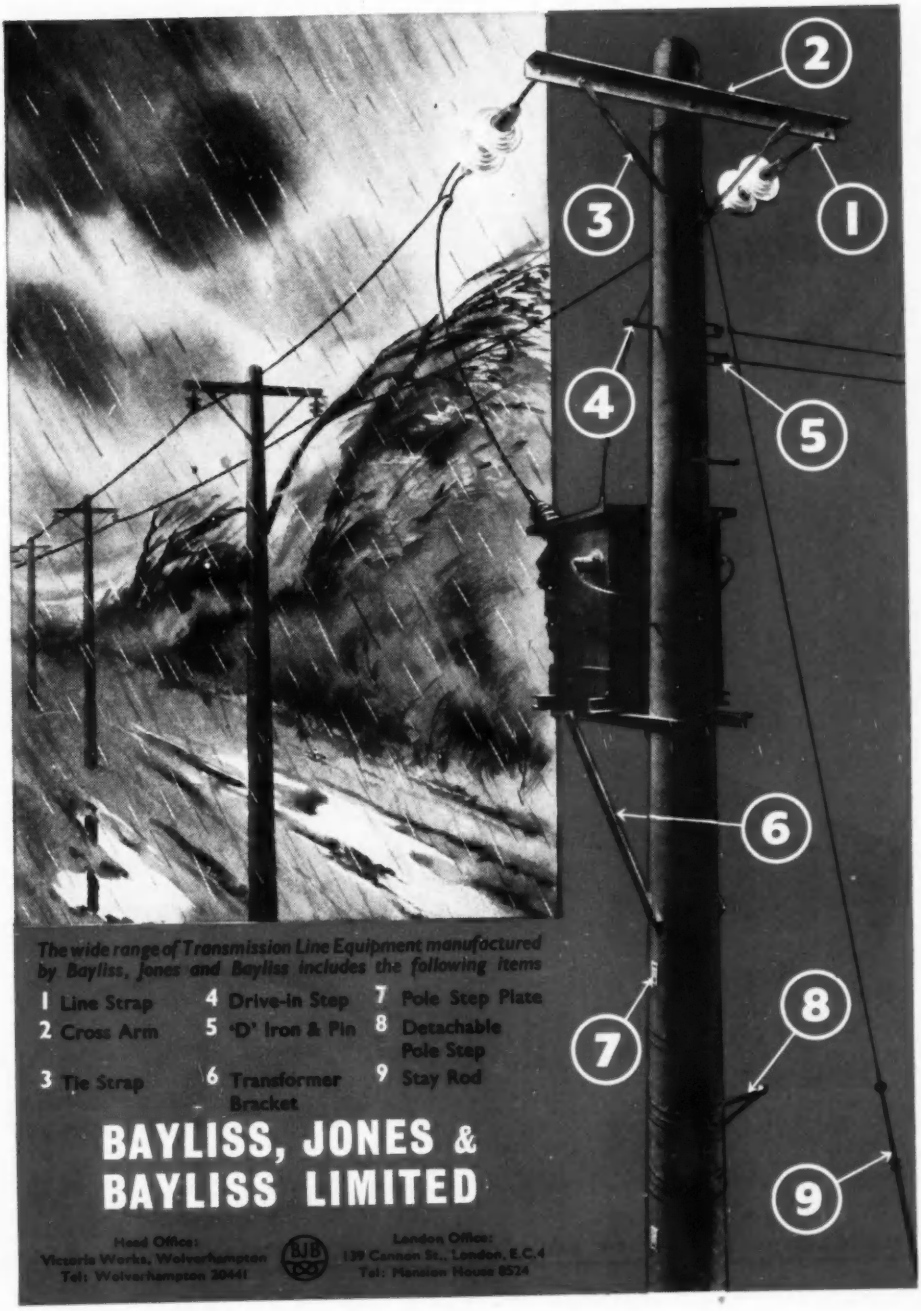


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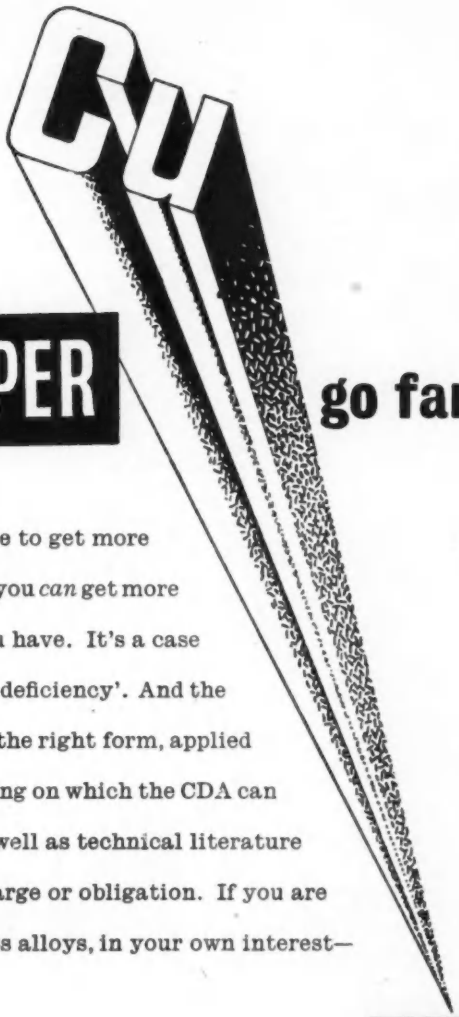


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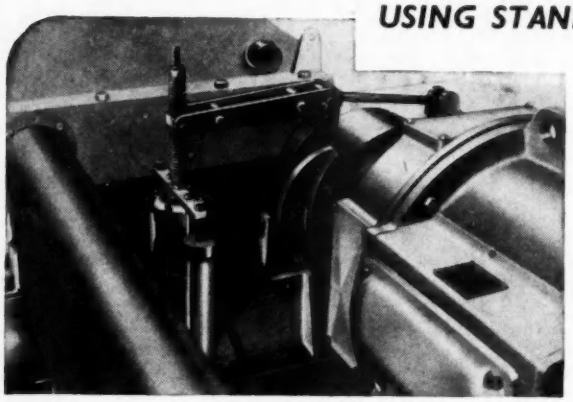
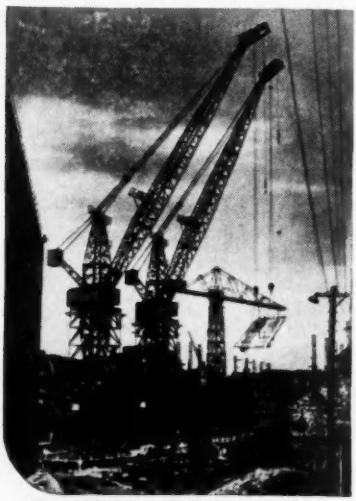


B T-H

**'STACREEP' brake control**



*Top : Thrustor and brake mechanism.*
*Above : Mono-tower crane with "Stacreep" control*
*Right : 30-ton travelling crane fitted with "Stacreep" control*

BTH "Stacreep" is regularly specified on important contracts.

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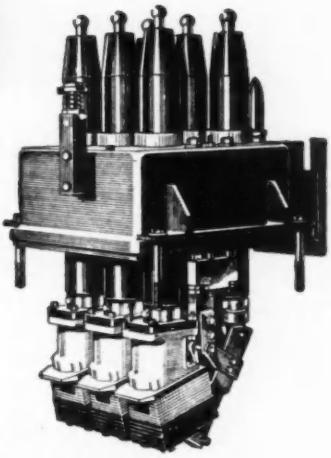

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## ARC-CONTROL BREAKER

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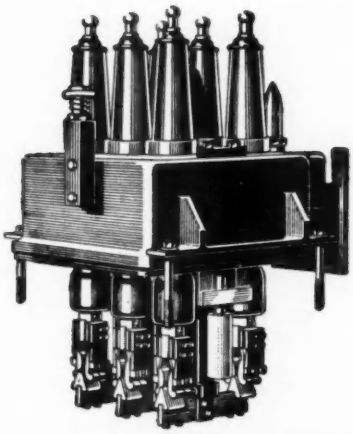

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## PLAIN-BREAK BREAKER

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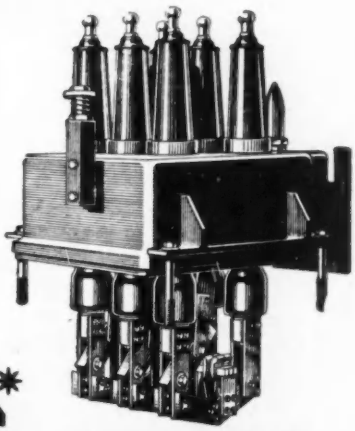

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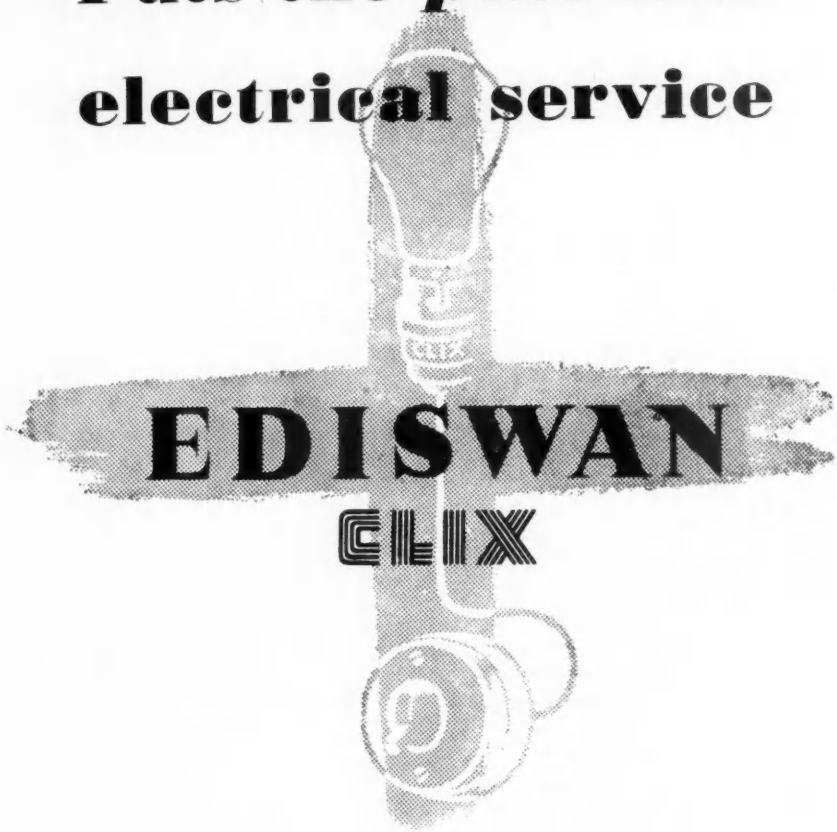


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E5

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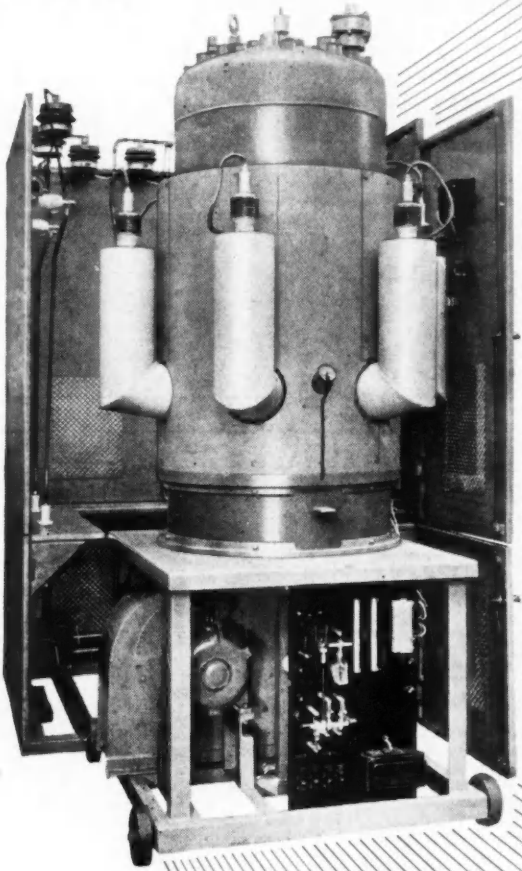

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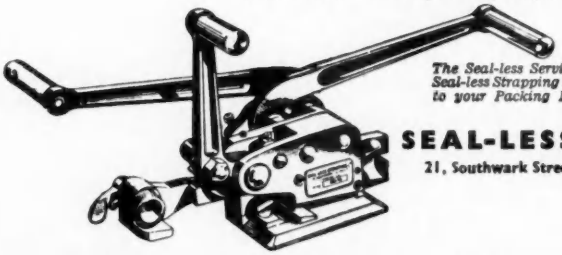

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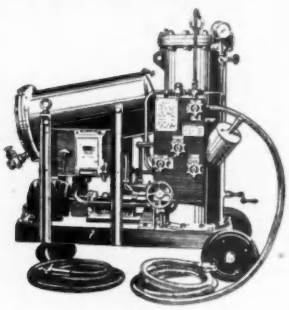
The plant is purely mechanical and extremely simple in operation.



*Capacities from 20 gallons to 1,000 gallons per hour.*

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THE METAFILTRATION COMPANY LIMITED, BELGRAVE ROAD, HOUNSLOW, MIDDLESEX

No. 5

# *ESSEX BEAUTY SPOTS*

*The illustration and information are taken from "Journeying into Essex," by W. R. Finch —printed by S. E. Recorders Ltd., Ilford.*

"Hatfield Broad Oak, Essex."

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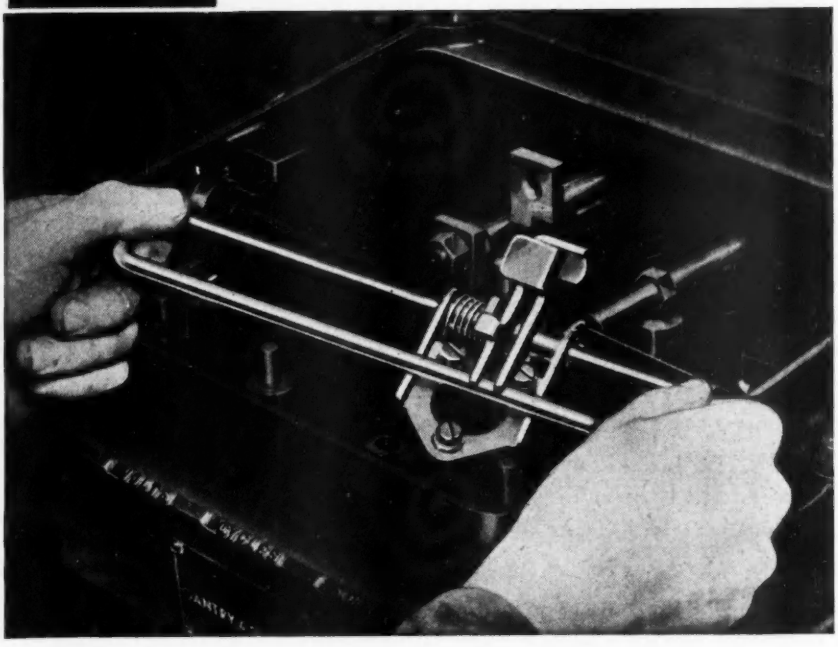

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ELECTRICAL TIMES

Vol. 121 No. 3162 THURSDAY, 12 JUNE, 1952

PUBLISHED EVERY THURSDAY

SIXTY-FIRST YEAR OF PUBLICATION

C.I.G.R.E. 1952 .. .. .. .. .. .. .. .. .. 1057

Pay Claim Held Up .. .. .. .. .. .. .. .. .. 1072

Our Readers' Views .. .. .. .. .. .. .. .. .. 1073

Notes on Wiring *by Megohm* .. .. .. .. .. .. .. 1074

Expanding Domestic Market in Tasmania .. .. .. .. .. 1075

Problems and Practice in Engineering .. .. .. .. .. .. 1076

In the Honours List .. .. .. .. .. .. .. .. 1077

Overseas News.. .. .. .. .. .. .. .. .. .. 1078

Personalities in the Industry .. .. .. .. .. .. .. 1080

Shrowroom for Strip Lighting .. .. .. .. .. .. .. 1083

G.W.B. Comes of Age .. .. .. .. .. .. .. .. 1083

Yorkshire Standard Tariff .. .. .. .. .. .. .. 1084

Diamond Ore Dried by Infra-Red .. .. .. .. .. .. 1084

The Buyer's Column .. .. .. .. .. .. .. .. .. 1085

The Week in News .. .. .. .. .. .. .. .. .. 1087

Electric Supply News .. .. .. .. .. .. .. .. 1092

Company Activities .. .. .. .. .. .. .. .. 1093

Commercial Information .. .. .. .. .. .. .. .. 1094

Classified Advertisements .. .. .. .. .. .. .. .. 43

Index to Advertisers.. .. .. .. .. .. .. .. .. 50

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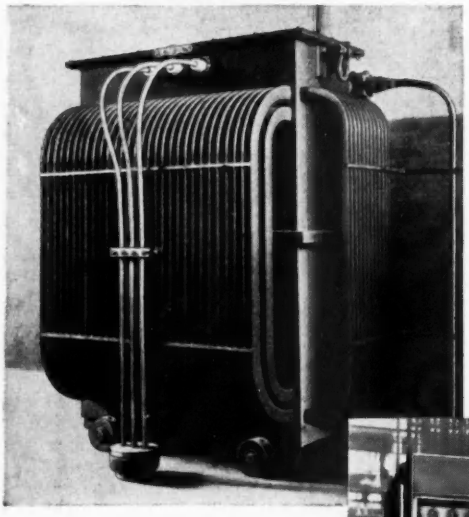

STATIC TRANSFORMERS AND MERCURY-ARC RECTIFIERS

(ABOVE) One of two 1,000 kVA 11 kV/400-230 volt Stepdown Transformers, at Frankley pumping Station Birmingham.

(OPPOSITE) A Mercury-arc rectifier providing a 300 amp. general load in a works Substation.

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# Editorial

### *C.I.G.R.E. 1952*

PARIS again! Once more those familiar meetings in the Rue Saint Dominique which marked another C.I.G.R.E. Each two years this conference sets up a new record in attendance which is perhaps the most significant measure of the high standing accorded to these meetings. This year forty-three countries were represented, including a Russian delegation which made a last-minute appearance; the members moving in square formation as though to prevent any of those informal chats which are such a valuable feature of the conference. With over one hundred and twenty papers presented and discussed, it is not possible to cover in an abstract all the many points raised, but the major themes are outlined later in this issue.

### *LINE-SUSPENDED C.-B.*

IF given the invidious task of selecting one paper of outstanding interest, we would suggest that dealing with suspended circuit-breakers. These breakers were developed as a result of extensive studies by Electricité de France and embody many unconventional concepts. Perhaps the most radical of these is the reduction of inertia of moving parts by allowing the mechanical operating mechanism with its compressed air reservoir to be at the line potential. The problem of breaker control is overcome by the transmission of tripping impulses by radio from the ground. This design, with its three single-phase breakers, is particularly advantageous for single-phase reclosing which is being adopted on French networks as for such duties operating times are of critical importance. Nevertheless, as Mr. Lane pointed out in the discussion on the paper, many of the ideas embodied in these breakers are equally applicable to more conventionally mounted switchgear. Should they be more generally adopted, considerable savings both in material and maintenance time could be achieved.

### *LINE LOADINGS*

ONE of the most lengthy of the discussions concerned the ice and wind loadings of overhead lines and towers. There was general agreement that safety factors at present allowed are higher than necessary, and in consequence important economies in construction could be made in most cases. The difficulty lies in obtaining a reasonably satisfactory basis for such a variable and unknown factor as wind velocity. Steady velocity conditions, which are usually prescribed, do not represent practical conditions, since the gusts which give rise to the greater pressures act only on narrow fronts at any one time. Ice loading also presents some unknown factors, one of which appears to be the actual electrical loading of the line itself, since two speakers reported the freedom from ice of unloaded lines. In Sweden and Norway, France and Switzerland, and doubtless other countries, the subject of wind and ice loading is the subject of special investigation, so no doubt, by the time of the next C.I.G.R.E. much further data should be available.

### *INVENTION UNABATED*

FEW men in this country are so well placed as the Comptroller-General of the Patent Office to appreciate trends in technical development. During 1951 his officers dealt with over thirty thousand applications for patent protection for inventions. The close analysis that is carried out on the subject matter of all this material gives a good measure of the technical liveliness of industry, and there is ample satisfaction to be had by the electrical world in the Comptroller's latest report. Out of nineteen subjects which are considered worthy of special mention because of the volume of patentable inventions relating to them, no fewer than thirteen are directly electrical in essentials. Telecommunication techniques of course, well to the fore, while

on the low-frequency side of the industry there has been considerable progress in the development of fluid magnetic clutches, and in the domestic field, "some activity directed to improvements in washing machines." Evidently inventiveness in the industry is continuing unabated.

## *CONSUMERS IN CONTROL*

IT was appropriate that the Yorkshire Consultative Council was able last week to announce approval of their electricity board's standard tariff, which had been modified to meet criticisms they had advanced. Only a few days before, the House of Commons had been debating the general problem of consumer representation in nationalised industries, and the suggestion was made that there was little a consultative council could do to affect board affairs. Here is a first-hand repudiation of that charge, so far as the electricity industry is concerned, and several other instances could be cited in support. But this vindication against a charge of complete ineffectiveness is far from a complete answer to current criticisms. The attitude of the Government seems relatively simple: the whole question of consultative councils is in the experimental stage. From this it may be supposed that the results of the experiment are due to be considered when the industries themselves come up for their seven-year review. No radical alteration seems envisaged, however: just two possible changes in structure. First is the adjustment of the alleged dual loyalty of the chairman of the consultative council; second comes formal divorcement of the council's secretariat from the staff of the Board concerned.

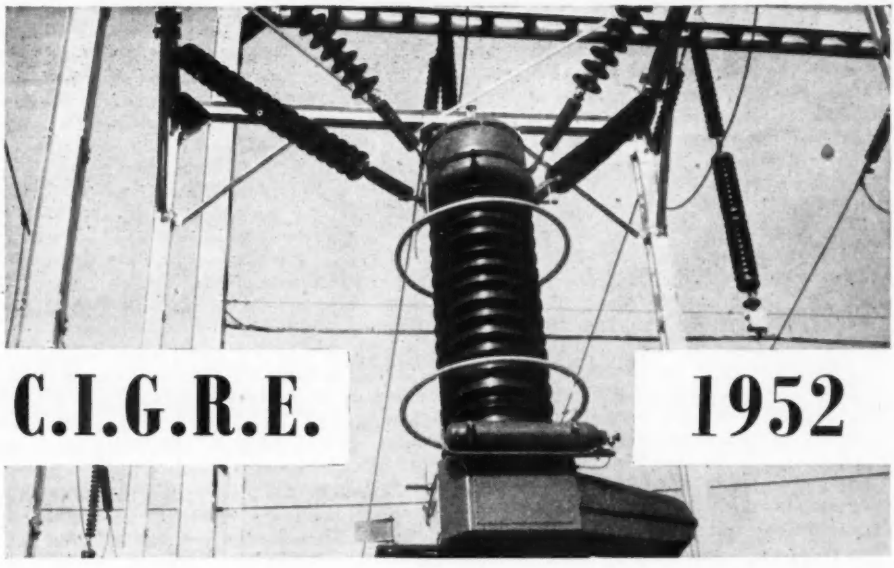
## *BOURNEMOUTH BRIEFING*

THE official theme for next week's truncated British Electrical Power Convention is "Research," a subject in logical sequence with the themes of the last three meetings. The electrical industry from its earliest days has made good use of the facts revealed by the continuous advance of science, and the review of the present organisation for this purpose should facilitate the wider use of these resources of research. We feel, however, that in spite of its undoubted importance, this topic will be overshadowed at Bournemouth by a matter of more immediate interest—the use of electricity for domestic heating. At the Convention the full effectiveness of the answer that is available to all counts of the case against electric comfort heating is to be put forward, carefully marshalled in its interlocking complexity. It should prove an inspiring occasion, and one that will enable delegates to the Convention to go their ways convinced of the sound basis for their support of the all-electric ideal.

## *COMPACT HEAT STORAGE*

HEAT pumps, like most forms of energy supply, work best on a steady load. Since heating demands are usually cyclic, the connecting link between ideal and reality is some form of storage system. In developing storage facilities, recent American work has concentrated on achieving compactness, and in one especially promising method the effect of the latent heat of fusion is added to the basic thermal capacity by using a substance with a suitable melting point—about 100°F—as the storage medium. So far tests have made use of a chemical known as disodium phosphate dodecahydrate, which in solidifying from 115°F gives up 114 B.Th.U/lb. With this salt packed in small containers, promising results have been obtained with test cycles between 80 and 115°F. Estimating on the basis of these temperature limits, storage of 300,000 B.Th.U. should be possible, together with necessary heat interchange arrangements, in a tank of 230 gallons capacity; with a storage system using hot water in an insulated tank, a 1,000 gallon container would be required for the same service. There are still many details of the scheme which require investigation and development, and large-scale field tests are only just under way, but none the less, this storage system seems to add a valuable technique to the growing flexibility of energy storage which may not be confined to the heat pump.

Meteor




THE 14th Session of the Conference Internationale de Grands Reseaux Electriques a Haute Tension, held in Paris last week, came to a close last Saturday. This conference, probably the most successful yet held, was marked by the intensity of work and the concentrated effort put in by the organisers. The policy adopted this year of having two separate sessions on different subjects running simultaneously, however, proved somewhat difficult to some speakers who found themselves in the position of having to attend separate meetings at the same time. Nevertheless, on the whole, the system worked fairly well and enabled much longer discussions to take place.

### Opening Ceremony

The opening ceremony, which took place on Wednesday, May 28, consisted of a speech of welcome by Dr. R. A. Schmidt, president of C.I.G.R.E., who regretted that owing to parliamentary duties Mr. Louvel, Minister of Industry, was unable to attend. He pointed out that C.I.G.R.E. was now being supported more strongly than ever. Over 1,300 delegates were present—an increase of some 100 on the previous session two years ago. The increasing world interest in the conference was exemplified by the fact that over 42 different countries were represented.

*Featured in the heading block is a spring suspended compressed air operated circuit-breaker for very high voltage, designed by Jeumont*

Mr. Louvel's place was taken by Mr. L. Saulgeot, Director of Gas and Electricity in the Ministry of Industry. A reply on behalf of the English-speaking delegates was given by Mr. Leipoldt of Canada who mentioned the increasing Canadian interest in C.I.G.R.E. Most of the power companies in Canada, he said, were now members of C.I.G.R.E. In 1939, he was the only Canadian delegate. This year there were 17 delegates and eight associates.

The opening morning was concluded by a lecture on the Swedish 380 kV system given by Mr. A. Rusck, of the Swedish State Power Board. This lecture was intended to give a background knowledge of the system to those members of C.I.G.R.E. who intended to take advantage of the offer extended by the Power Board to visit Harspranget, the new station north of the Arctic Circle, after the conclusion of the conference.

Details of this scheme have already been published in the ELECTRICAL TIMES.

### Alternators

The afternoon of the first day was devoted to two sessions, one on alternators under the chairmanship of Mr. G. Belfils (France) and the other on interference under the chairmanship of Mr. C. W. Marshall (G.B.) As far as the alternator session was concerned, attention

was concentrated, in the discussion, on two main themes. First, the choice of leading dimensions, speed and electrical characteristics of the larger machines, and second, operating conditions, stability and protection. It should, however, be pointed out that the discussion, and indeed the papers, referred almost entirely to large hydro-electric machines, and that all the papers with the exception of one were of foreign origin.

The main arguments in the discussion centred around paper 135 "Choice of Constants for Synchronous Machines" presented on behalf of the Study Committee on Generators by Mr. O. Hess (Switzerland). In this paper, the effect of the output and the number of poles upon the acceleration time was considered, and it was explained how the relationship between the growth in weight of a machine was influenced by the maximum peripheral speed and the speed chosen according to output per pole. In order to reduce the acceleration time, it was proposed to make greater use of a voltage regulator dependent on frequency and to base research on a constant of auto-regulation of a network. The overspeed reached in the case of disconnection of full load should be limited to a maximum of 50%. The effects of damping on stability were also considered at some length in the paper.

In the discussion Mr. Laurent (France) illustrated the three types of instability which might occur. One, when the system fell out and then returned to a steady state due to a fault, second, when the system open-circuited, or when a line was open-circuited and a charging current flowed, and third, when lines in parallel had a fault occur on one of them. These three cases could be shown graphically and each had a different effect. The use of high speed circuit-breakers could alleviate the first, but the others resulted in slip and loss of synchronism. He agreed that the overspeed values should be increased to 50% instead of the present 20 to 30%.

Mr. S. B. Crary (U.S.) also considered the proposals put forward in Mr. Hess's paper. The transient stability depended on the transient reactance and to increase the latter saved money as there was no need to increase the Moment of Inertia of the machine. On hydro-electric generators, this worked quite well, although it did not operate so successfully on turbo-generators. He maintained that the governing should operate within fine limits as by this means stability was much improved.

The question of stability was also dealt with by Dr. Stromberg (Sweden) who considered the transient reactance to be most important, the inertia constant, being less vital.

*The audience listens with interest to Dr. Schmidt at the opening ceremony*

*Dr. R. A. Schmidt, president of C.I.G.R.E., speaking at the opening ceremony*

Mr. B. Rathsman (Sweden) considered the question of the standardisation of output voltage. It was best, he thought to leave the question of voltage to the manufacturer for a wide range of ratings. This saved money as a simple form of winding could then be selected to suit the output. They had used this method in Sweden with success and he saw no objection to it.

## *Alternators (Second Day)*

The alternator session carried on into the morning of Tuesday, and for some time the questions of stability and selection and standardisation of voltage held the platform. Mr. R. Langlois (France) stated that Electricity de France had established standard voltages for their smaller machines. For the larger machines, he thought they might go up to 50 kV. He suggested that the medium voltages might well be standardised, and said that although some studies had indicated a possible increase in cost for certain units at standard voltages, these cases were exceptional. In most machines two conductor bars per slot would generally be satisfactory.

Mr. G. Bonnefoy (France) returned to the question of stability. He thought that auxiliaries should be fed direct from the main generator. If one had a heavy power swing developed, the damping windings proved useless as the period was so long. If pole slipping were to take place in these circumstances, he had found that in his experience no damage to the machine occurred providing the excitation was greatly reduced.

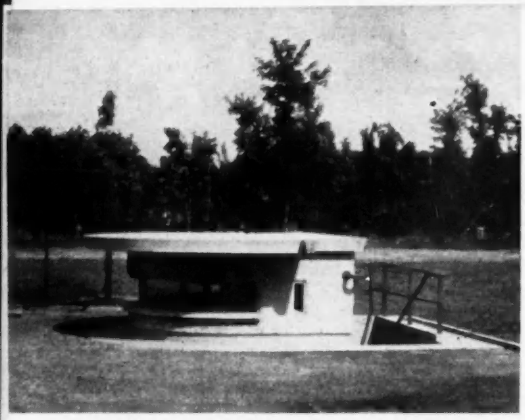
Mr. D. Gaden (Switzerland), said that as a mechanical engineer he appreciated the concentration on acceleration constant. Large values of overspeeding could occur from sudden off-loading of a generator. What was needed was more response from the governors for small changes in line conditions.

Operational considerations then came up for discussion. The main paper (119) in this field was a general report presented in the name of the Study Committee on Generators by W. D. Horsley (G.B.), although many of the other papers contained references of importance. Mr. Roubinet (France) referred to overheating of rotors, and pointed out that on one occasion when brushgear broke he had found it possible to run with only one brush in the holder by under-exciting.

Mr. R. H. Coates (G.B.) discussed the question of preheating of rotors. He said that on one set they had operated with rotor preheating for some eighteen months with no trouble. Owing, however, to a change of personnel and the reconstruction of the station, preheating had to be dropped and the rotor was damaged within twelve months. He emphasised, however, that this might not be a conclusive case as rotors went down for a variety of causes and the collection of data over a number of years was difficult. Rotor failures, he said, were not confined to old plant but were as great in new machines which had been recently commissioned.

Mr. H. Josse (France) considered that the preheating of rotors led to unsymmetrical conductors. Tests on a 71,000 kVA set had not been encouraging. Creeping of the rotor windings, was neither inevitable nor unavoidable.

Finally, the question of voltage stability with and without voltage regulation (Paper 127 by Strömberg and Knudsen) was dealt with. Mr. Crary (U.S.) gave some details of operational tests and Mr. Knudsen (Sweden) said



*Underground observation and control room look-out point at one of the test bays at Fontenay*

that in Sweden it had been shown in the laboratory that a generator with a voltage regulator could operate on a capacitative or artificial line, provided the load reactance was greater than the quadrature axis synchronous reactance of the alternator. The last big tests took place in Sweden some months ago when the 380 kV line from Harspranget was first energised at 300 kV. Good agreement was found between the calculated and practical values. In his view automatic voltage regulation was most important now, and would become even more so in the future.

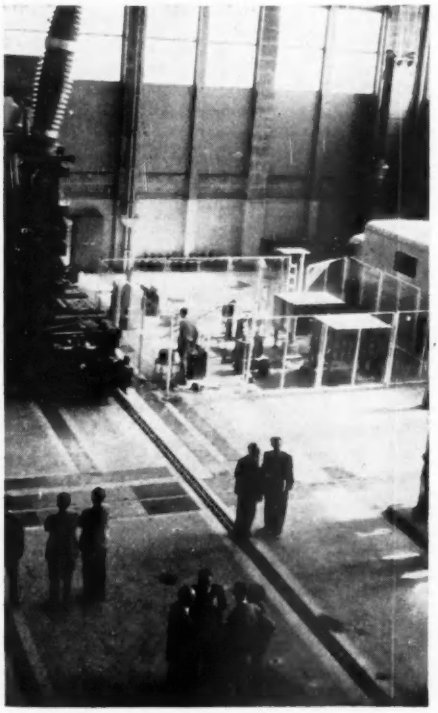
### *Interference*

As we have already mentioned, two sessions were being held simultaneously and on the Wednesday afternoon while the first part of the alternator session was taking place, the question of interference from overhead lines was being dealt with. As frequently happens in a discussion on a special subject, some of the papers referred to fell in another general category. Two papers of this nature were Power Loss and Radio Noise on the 275 kV Experimental Line (301) by Dr. J. S. Forrest (G.B.) and Experience on the 500 kV Test Station at Chevilly by F. Cahen and R. Pelissier (France). Mr. Marshall (G.B.) chairman, in his introductory remarks said that the most important conclusion from these two papers was that interference from high voltage lines did not appear to be troublesome even at close quarters. On the question of interference from grid controlled mercury arc rectifiers, the paper by Prof. E. Gerecke (Switzerland) (314), was most interesting, giving details of a comprehensive investigation into the radio interference levels. Mr. Cahen (France) in the discussion said that he had obtained very similar measurements from independent tests.

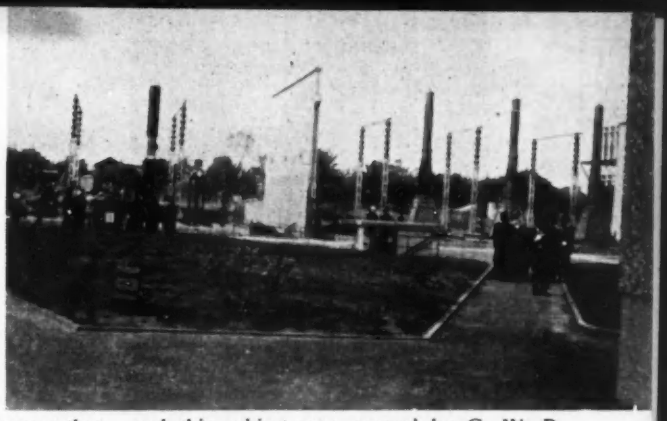
Dr. Forrest (G.B.) confined his remarks to interference with reception at very high frequencies. In his experience little trouble was caused to television reception by interference from high voltage lines. Mr. Csuros (G.B.) said it was probable that problems of radio interference would have different aspects in different countries. In Great Britain, there appeared to be no economic reason for adopting the system of radio transmission over the power lines as was described in paper 323 by S. Parding and C. A. Eastrom. (This paper incidentally, described a method of transmitting a radio programme using the interfering line as an aerial).

Precautions necessary to prevent errors in measuring the field strength of interference were the subjects of Mr. Renaudin's (France) remarks. Mr. Blok (Netherlands) who presented a paper (328) on the general subject of interference suggested that C.I.G.R.E. should get in touch with other organisations with a view to improving the present somewhat confused legislation on the subject.

An instrument to indicate the maximum value of peak voltage and current in lines under fault conditions was described by Mr. Angelini (Italy) in paper 326, but Mr. Dietsch (France)



*View inside h.t. laboratory showing side of a Jeumont 400 kV transformer ready for testing*



*General view of the circuit-breaker test bays at Fontenay Station*

reported that about 100 such instruments were at present in use on the 220 kV French network and Mr. Csuros said that a similar instrument was in wide use on the British Grid.

Mr. Cahen (France) in commenting on paper 402 by Messrs. Sporn, Saint-Clair and Peterson (U.S.) thought that the authors' concept that radio interference might limit the adoption of voltages above 300 kV was wrong. In his view, radio interference would not hinder the use of any voltage at least up to 400 kV. Mr. Marshall (G.B.), Mr. Saraoja (Finland), Mr. Jancke (Sweden) and Mr. Forrest, all agreed.

### *Teletransmission*

In the morning of the second day (Thursday) while the second session of "Alternators" was being held a separate meeting was considering "Teletransmissions" or the use of high frequency channels for signalling and communication duties.

This subject is somewhat complex owing to the various requirements which differ with alternative systems. The main difficulty in any form of h.f. transmission over power lines is the possibility of maloperation of the equipment due to interference, surges or lightning impulses. One of the best methods of minimising interference troubles is by using a phase comparison method of signal detection, and a practical system using this was described by Messrs. Chevalier and André (France) in a paper (337) dealing with the switching station at Breuil. Power supplies are of course of vital importance and this subject was covered by G. W. B. Mitchell (G.B.) in (317). Other papers dealt with the effects of transients and line faults on the operation of the equipment.

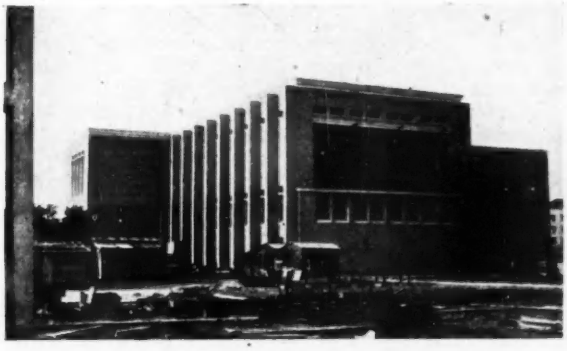
Mr. Mitchell's paper caused considerable discussion. Mr. André amplified the information given in his paper, and described the equipment actually used at Breuil. Replying to Mr. André, Mr. Mitchell thought that the French methods were unduly laborious. Mr. Rodhe (Sweden) agreed with Mr. Mitchell while Mr. Scherens (France) considered the practicability of using diesel engines.

The Swiss system was outlined by Mr. de Quervain who considered that for four or five channels, the French system using batteries fed from the mains via rectifiers and then converting the d.c. to a.c. by rotating plant for power supply to the teletransmission equipment, was the best. Mr. Mitchell, however. pointed out that the G.P.O. system of using two-cylinder diesels for primary power had given every satisfaction up to the present.

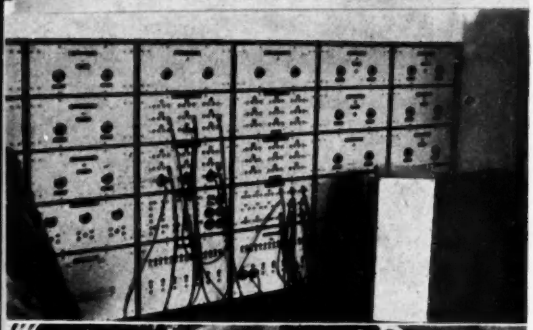
On the question of faults leading to maloperation, Mr. Kauffmann (G.B.) pointed out that in Great Britain, h.f. signals were only transmitted at the occurrence of a fault and were not permanently imposed on the line. Thus transients and induced voltages did not affect the system. In his view the use of h.f. was not justified unless for distances over 15 miles.

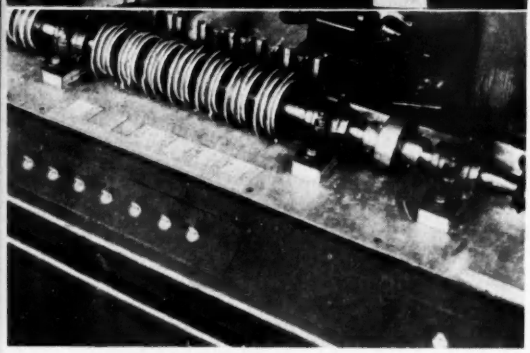
Mr. Rodhe (Sweden) expressed the view that the operating time of the h.f. channel should be less than 15-20 millisecs, Mr. Chevallier, however, showed that factors existed which led to an operating time of 70 millisecs,

In conclusion Mr. Poma outlined the great importance of electronic methods in the control of power systems, and thought that Mr. Chevallier had opened up a new field of application.



*The new high-tension laboratory is an impressive building*





*Top left: Plug-in connections and racks for connecting test equipment to the sixteen installed oscillographs in the main control building. Below, left: this cam system controls the sequence of events in the testing of switchgear and operates the back-up protection after 3 cycles*

### *Circuit-breakers*

The first subject dealt with in the session devoted to circuit-breakers was that of overvoltages and restriking voltages. Four main papers were devoted to this subject, two British by Mr. J. S. Cliff and Messrs. Gosland and Vosper, one Swedish by Mr. O. S. Johansen and one from Belgium by Mr. F. Belot.

The discussion on this subject was opened by Mr. D. F. Amer (G.B.) who first considered the employment of rod gaps to avoid overvoltages. He described switching tests on a 45 MVA transformer using an air break switch rated at 5,000 MVA and an oil-breaker rated at 2,500 MVA. The tests showed that the circuit-breaker itself limited overvoltages due to magnetising currents to values less than that needed to give a 26-in. gap. It was important to keep the arc length as short as possible. In their air blast breaker they had four breaks with a 6-in. arc length. The voltage broken was not a direct multiple of the number of breaks, but was proportional to the square root of the number.

The overvoltage needed to be assessed in relation to the network. He thought that for most systems there was a low probability of overvoltages occurring and this had been shown by tests.

Mr. J. S. Cliff (G.B.) thought that the use of h.v., h.r.c. fuses, greatly limited the value of restriking voltage. He suggested that peak values should be given as 3·3 kV (20 kV peak), 11 kV (45 kV peak), 33 kV (120 kV peak), 66 kV (185 kV peak), 132 kV (315 kV peak).

Mr. K. Dannenberg supported Mr. Cliff's statements. He thought the fuse was ideally suited to protection on high capacity loads.

Dr. Mortlock (G.B.) emphasised the fact that the short-circuit value was usually limited by one specific item of equipment, and this could materially affect the transient value. In the past it had been impossible to estimate the rise in voltage on switching transformers without tests on site. Now this could be done mathematically.

Rates of restriking voltage (r.r.r.v.) occupied the meeting on Friday morning. Mr. Gosland (G.B.) compared a formula given in Mr. Johansen's paper with the results obtained on the British system. The most onerous switchgear duty on this system occurred at about 50% of the rated value of the breaker. Mr. Johansen's formula gave lower results than actually found. This was probably due to the heavy load and power concentrations on the Grid. Mr. de Zoltan (Low Countries) pointed out that the r.r.r.v. depended on the network and it was, therefore, hardly possible to standardise.

Mr. McNeil (G.B.) thought that the average reference characteristic of the type proposed in paper 104 for the Swedish power networks was satisfactory for some breakers but mitigated against others. He doubted whether the introduction of the factor was necessary.

The use of the network analyser to determine r.r.r.v. was dealt with by Mr. C. H. Lackey (G.B.), who said that it was now possible to obtain direct values of r.r.r.v. He thought that fault testing was not the most satisfactory method, although it might be necessary to put on faults to check the analyser. It seemed absolutely impossible to get standardisation on r.r.r.v., unless conditions could also be standardised and he suggested that the C.I.G.R.E. committee should tackle that job first.

Mr. Herlitz (Sweden), said that the fundamental importance of I.E.C. work lay in the recognition of r.r.r.v. and its definitions. Recommended values would never prevent the user from specifying his needs and demanding the necessary tests, but definitions and recommendations might provide for less testing time on small breakers.

A plea for direct testing was put up by Mr. Belot, who thought that there were too many nebulous factors involved in calculation. A

suggestion was then put forward by Mr. Cliff (G.B.) that as the r.r.r.v. in Great Britain and America was higher than that on the Continent, two values should be used, one for the former and one for the latter.

Mr. S. E. Schultz (U.S.) described the Columbia substation of the Bonneville Power Administration. The requirements there were for high-speed break and high-speed reclosure. He put forward a special plea to the switchgear designers to consider easy maintenance and contact replacement. Mr. A. J. Gibbons was concerned about the proving of large circuit-breakers, and suggested that the short-circuit testing station organisation should consider the extension of certain stations to give basic data on very large high voltage switchgear.

Some comments were also made on paper 136, by L. Alran which gave details of methods of reducing the costs of installation and operation of very high voltage breakers by separation of the functions and suspension mounting. Mr. Lobut (France) added some details to those given in the paper, but Mr. F. J. Lane (G.B.), said he was not quite happy about the proposals. He thought that the improvements could well be added to existing designs, and doubted if any particular economies would be made by suspending the units.

## *The Fontenay Testing Station*

On Friday afternoon, many of the delegates took the opportunity of visiting the high-tension testing station at Fontenay. This was described in our previous account of C.I.G.R.E. in 1950. Since that time, however, good progress has been made with the erection of buildings and the installation of equipment. In addition to the outdoor sections, which are devoted mainly to switchgear and cable testing, a high-tension laboratory is now in course of completion. The testing room has been designed with sufficient clearances to permit testing of equipment at industrial frequencies up to the 380-400 kV range and equipment is available for handling the largest transformers within the test room.

## *Test Equipment*

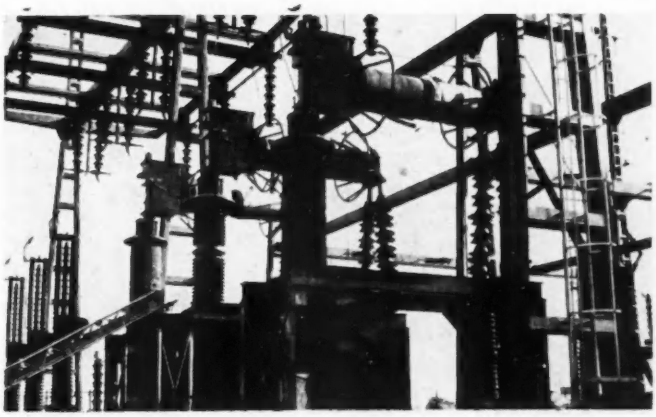
The principal item of equipment is a transformer designed to give a maximum output voltage of 1,000 kV at 50 c/s with a current of two amperes. This is powered by a special alternator set in the machine room. Three impulse generators are available, one of the Marx type giving a peak wave of 3,000 kV, a mobile unit to give 400 kV peak and a heavy power unit to give 100 kV peak. This latter unit has a capacity of 12 microfarads giving a discharge of 60 kilojoules. The current values rise to peak intensities of about 100,000 amperes. Power is obtained by a kénotron rectifier from two alternators, the rectifier output being 100 kV.

A comprehensive oscillograph room containing all the necessary instruments is available for metering and recording purposes and auxiliary facilities for simulating atmospheric conditions have been made available.

The main switchgear testing section of the station has now been completed by the addition of a central control and recording centre All the oscillographs and the sectionalisation of the main power networks can now be carried out from this building.

It was interesting to note that the Brown-Boveri air-blast non-isolated breakers which were last year up for test, were now being used as back-up breakers on the main system.

Several high voltage cables of various



*New U.S. small oil volume breakers being installed at Fontenay for main control purposes on the Electricite de France 220 kV network incoming point*

manufacturers were under test including examples by B.I.C.C. and Enfield cables.

### *Transformers*

As usual the subject of transformers caused a great deal of attention, over twenty papers being concerned with transformer problems. A large proportion of these were primarily devoted to testing, particularly impulse testing and the detection of faults, and it was to these questions that the morning session on Saturday was devoted.

The main paper (129) under discussion was a "Study of Fault Detection and Failure during surge Testing of Transformers," sponsored by a CIGRE Committee and written by E. Stenkvist (Sweden). A point raised by Messrs. Stenkvist (Sweden) and Aeschlimann (Swiss) was the difficulty of locating the actual fault after it had been detected by the oscillograms derived from the surge test.

A divergence of opinion was evidenced in the discussion on the use of chopped waves. Messrs. Stenkvist and Husbands (G.B.) thought that the detection and location of faults by this method was difficult. Messrs. Rippon and Hickling (G.B.) and Mr. Chevalier (Belgium) did not exactly agree. The discussion also split on the method of producing the chopped wave and on the shape it should possess. The people who took part in this particular facet of the general discussion included Mr. Perry (G.B.), Mr. Renaudin (France), Messrs. Rippon, Wadland and Robinson (G.B.) and Mr. Provoost (Low Countries).

Ionisation problems occupied the first part of the afternoon, Mr. Chevalier (Belgium) dealt with ionisation during impulse testing, while Mr. Gosland (G.B.) pointed out that the best criterion of the severity of ionisation was the energy associated with the discharges. Mr. Hylten-Cavallius (Sweden) explained the difficulties met in ionisation measurements in separating the ionisation within the gear under test from that occurring within the test equipment.

Finally thermal problems were dealt with. Probably the most interesting contributions to this part of the discussion were those by Mr. Lane (G.B.) and Mr. Larrue (France). Mr. Lane emphasised the using of the thermal image as an indication which could greatly aid in providing continuity of supply. Mr. Larrue indicated the practice adopted by Electricité de France in this field.

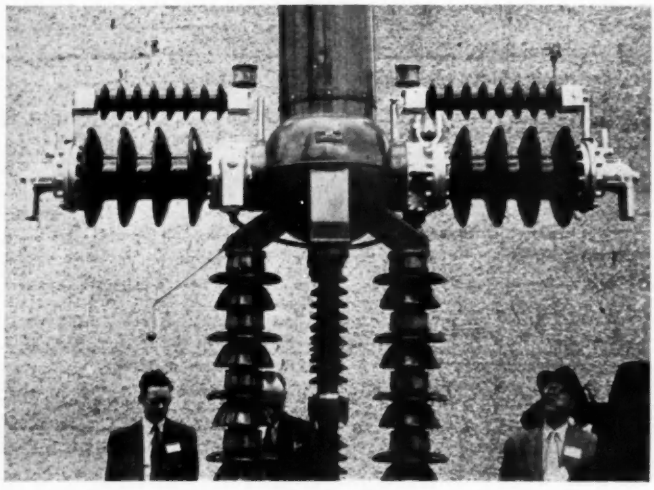
Other papers which did not deal with testing, ionisation or thermal problems were not admitted to the general discussion.

### *Insulators*

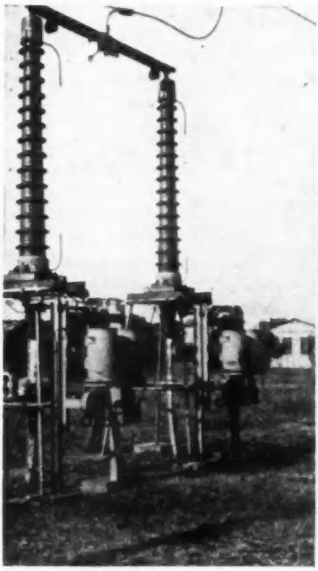
Only three papers were submitted covering problems of insulators. Mr. E. F. Johnston (G.B.) submitted a paper on the toughened glass insulator; Messrs. P. Schuepp and L. Gion (France) dealt with a study of the periodic variations in the mechanical stresses on insulators. The last report by Messrs. Runcimann and Curtis was on the life of insulators.

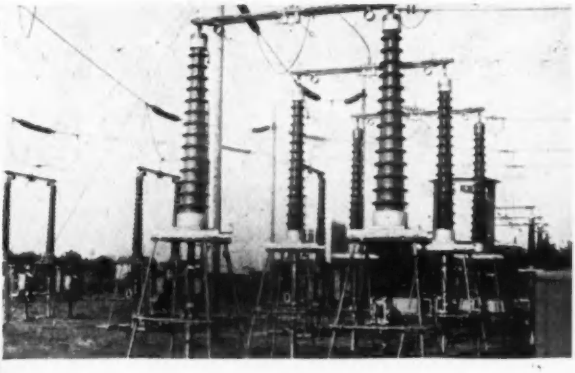
A doubt was cast on the possibility of obtaining reasonably sure information on the life of toughened glass insulators, both because of the difficulty of using suitable detection methods and also because of the lack of long-term operating experience. Mr. Anderson (U.S.) thought there was a possibility of stress variation within the toughened glass occurring with time.

Mr. Johnston in his reply confirmed that in his opinion the stresses in the glass caused by the toughening process would remain absolutely constant. The lack of information on depreciation of insulator performance was probably



*A Merlin et Gerin h.v. breaker is the subject of study by some of the delegates*





*Above: B.I. Callenders Cable ends with conducting glaze porcelain in the testing ground at the Fontenay h.v. station.*

*Left: Enfield gas compression cables and sealing ends under test.*

due to the fact that the actual deterioration was so slow that it passed virtually unnoticed. If any trouble were to be experienced it would occur within the first ten years of life.

Finally, Mr. Cross (U.S.) declared that according to American experience the life of a cap and pin insulator of the cemented type might safely be estimated at 50 years.

### *Protection and Relaying*

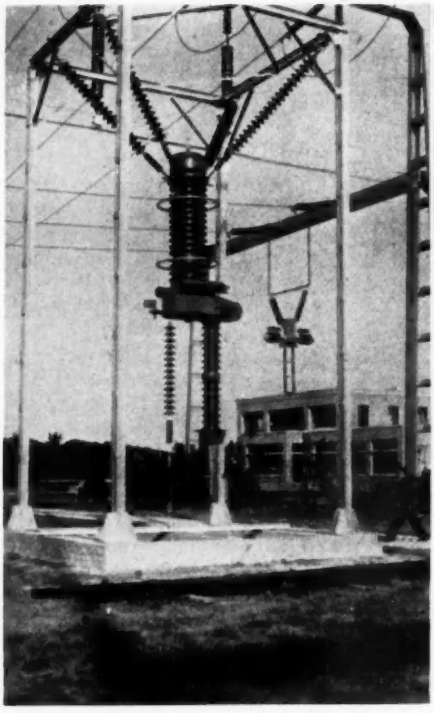
In this section particular interest was directed toward a paper by Dobson and Mason (Canada) on a single-pole reclosing (316). This was mainly aroused by the fact that the authors had discovered that a high frequency oscillation could be produced in the fault itself, or which could cause maloperation of the protective equipment. Mr. Kaufmann (G.B.) in opening the discussion pointed out that single phase reclosing problems did not occur on the British network. He also referred to paper 303 which, he said, gave full details of the type of emission which could occur from arcs. Mr. Lackey (G.B.) also referred to the arc emission as being a cause of maloperation. He suggested that remedies were to delay the operation of the locking relays for 50 millisecs. He also thought that much maloperation by h.f. delivered from faults was due to the receiver having too high a sensitivity. He thought that the 6 cycle reclosing time mentioned by the authors was exceptionally short. Mr. Elmunds (Sweden) gave results of some Swedish tests, and said that as arc h.f. current was small compared with the signal current, maloperation was improbable.

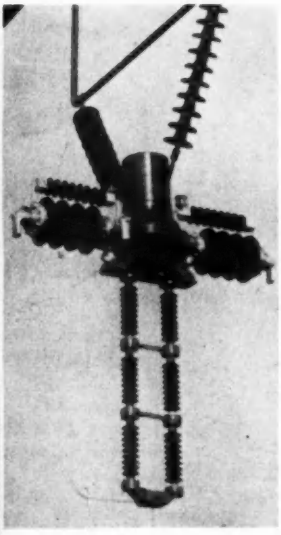
In the afternoon session, the problems of statistical data on faults and fault clearance aroused considerable interest. Most speakers agreed that some form of analysis was desirable, but again most admitted that they did not know exactly how such statistics could be collated so as to present a true picture of the reliability of operation.

### *High Voltage Transmission*

A minor sensation was caused on Wednesday morning when the subject of high voltage transmission came up for discussion, by the unexpected arrival of a delegation from the Soviet Union, headed by A. V. M. Mirolouboff, who submitted a paper dealing with the projected 400 kV scheme for the Volga basin.

These lines are to transmit large bulk supplies of hydro-electric power over considerable distances, and extreme precautions have been taken to ensure stability. These include ultra-rapid excitation of the large water wheel alternators, and compensation both by capacitors and synchronous condensers. The latter will be hydrogen-cooled open-air units rated at 75 MVA. Shunt reactances will be placed in the middle of the line lengths to provide zero drop in voltage at low loads. The circuit-breakers will be of the ultra-high-speed operating type. Generally, however, the development is on classical lines. The Moscow link will have a





*A Jeumont circuit-breaker is seen in the foreground. Note method of suspension. In the background is a Merlin et Gerin circuit-breaker. It is seen more clearly in the smaller illustration*

capacity of 1200 MVA. Following the speech in Russian by Mr. Miroloubоff, Mr. Rusck (Sweden) pointed out that their 380 kV system now had 1,000 kM in operation, and 1,700 kM under construction. By 1956 some 2,700 kM of 380 kV lines would be in operation with ten transformer stations.

Several additions to papers presented were given by the authors. Dr. Forrest (G.B.) showed a slide giving the noise measurements from 275 kV lines at frequencies up to 150 mc/s.

When the discussion became general it initially became a series of questions and answers. Mr. Melville (U.S.) wanted to know the location of the future British power stations, as to whether they would be located at the pit head, and also wanted to know the size of future generating sets in Britain. He was particularly interested in the proposal to use rod gaps for protection, as in America the practice was to use lightning arrestors in all important stations.

Mr. Rathsman wanted to know the economic basis on which the Americans had selected 330 kV for the Gas and Electric Company's new e.h.v. transmission system. A reply was given by Mr. Brooke (U.S.) who outlined the economics of the system. Mr. Herlitz (Sweden) thought that if a voltage increase was necessary on a large system, the new voltage should be at least twice that of the one it superseded. He was surprised at the American argument for 330 kV when 300 and 400 kV were standard voltages. Mr. Schultz (U.S.) gave some details of the projected Bonneville Power Administration System. He thought that high-voltage d.c. was too costly at the present state of development.

A reply to the lightning arrestor question posed by Mr. Melville was given by Mr. Gibbons (G.B.) who explained that the high level of industrial pollution in Great Britain which could occur on the insulation of lightning arrestors made their efficient operation doubtful. Mr. Chevalier (Belgium) had some words to say on the use of shell type transformers for 380 and 400 kV use. He emphasised that in his view chopped wave testing was most important.

In the paper devoted to the American 330 kV system, considerable space was devoted to problems of icing and a question was put to the Swedish delegation as to their experience in this field on the 380 kV system. Mr. Sandstrom replied to this, and pointed out that they had had no trouble with icing-up of conductors but had had occasional experiences with the earth wires. On the 380 kV double-conductor system, the only icing-up trouble had occurred on unenergised lines.

Mr. Cravy (U.S.) returned to the defence of 330 kV network, and maintained that there was a necessity for some standard voltage between

300 and 400 kV. Mr. Cahen said that Mr. Schultz, who had mentioned a variety of European standard voltages of 380 kV, 275 kV and 315 kV, had missed the point that all these voltages were merely intermediate steps toward a 380 kV European network.

Mr. Sayers (G.B.) replied to Mr. Melville, and stated that the new power stations would be sited near the pits. Their calculations had assumed a rail haul of 20 miles from pit to power station. Double circuit lines had been adopted because of wayleave troubles. With regard to set size, most of those going in at the moment were about 60 MW, but several 100 MW units were on order.

Mr. Cross (U.S.) Chairman of the Group, commented on the 330 kV project. He agreed that the small conductor diameter selected had been so that the lines could be heated to prevent ice loading. He strongly supported the selecion of 330 kV as the voltage.

The Russian delegates then replied, via the Chair, to some questions asked during the debate, and in turn submitted a detailed set of questions to the Swedish delegation on their 380 kV system. The Chairman, however, pointed out that the questions were far too detailed and specific to be dealt with in an open meeting and suggested that the Swedish and Russian delegations should get together.

The final part of the session was devoted to interference arising from e.h.t. lines.

## *Lightning and Surges*

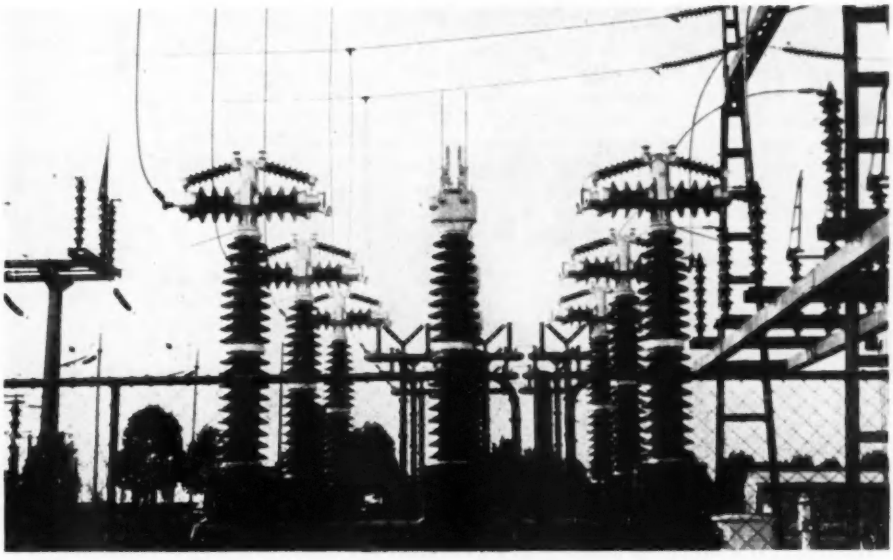
Several papers were presented on "Lightning and Surges," which were dealt with last Thursday. These papers were divided for the purposes of discussion into three main categories. First was the lightning performance of overhead line systems, second lightning arrestors and protection against surges and, third, the earthing of systems.

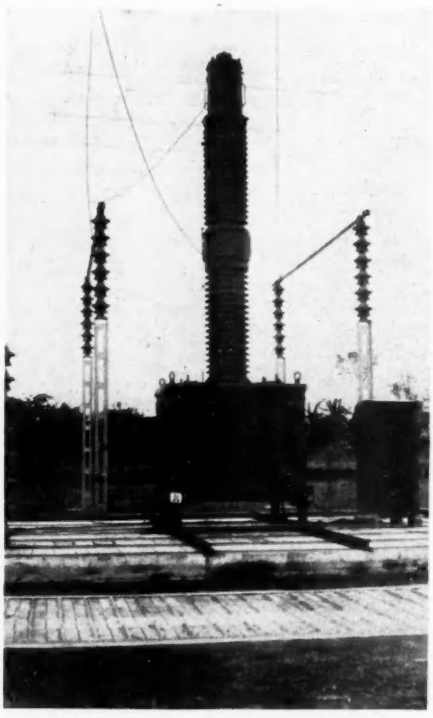
The discussion was opened by Mr. Bodier, who explained a method of computing the effects of surges on networks by means of a graphical attack. This method, he pointed out, had been devised for the solution of hydraulic problems; it could, however, be applied to electrical surges and was a great time saver.

Dr. Mortlock (G.B.) commented on Paper 309, which gave a method of estimating the lightning performance of transmission lines, and Mr. Slettermark (Sweden) had something to say on the relation between the number of faults to the isokeraunic level. The method of analysis developed by the E.R.A. was covered by Mr. Golde (G.B.) whilst the fallacy of using a general isokeraunic level to estimate line performance was considered by Mr. Cabanes who said that local conditions, particularly geographical, had to be taken into consideration.

As an additional protection against lightning Mr. Ledoux (France) suggested that impregnated wooden cross-arms should be used. Experi-

*Merlin et Gerin back-up circuit-breakers*





*Alsthom S.O.V. high voltage on test rig*

ments were shortly going to be tried out on some lines to assess the value of these.

Mr. Crary (U.S.) referred to the results of a questionnaire sent out in the United States and the difficulty of interpreting the results. The complexity of the problem was also dealt with at great length by Mr. Wagner (U.S.).

In the afternoon session, Mr. Sandstrom (Sweden) returned to the question of lightning arrestors. He pointed out that calculations to discover whether or not they should be fitted were somewhat uncertain. In Sweden, however, they considered it economic to install lightning arrestors in all stations down to 6·6 kV for every piece of equipment rated at over 300 kVA. They did this despite the fact that the isokeraunic level was very low, being only ele /en. The cost, he thought, was small in view of the protection the arrestors afforded.

An opposing view was expressed by Mr. Neuve-Eglise (France) who emphasised that in France they regarded the isokeraunic level as only one of the factors which required to be taken into account. At the present they used no arrestors on the system.

Mr. Ledoux (France) described a gap in which part of the path was occupied by a variable resistor. This had passed satisfactory tests and had the advantage of avoiding the chopped waves which resulted from the firing of an ordinary gap.

Mr. Teszner (France) emphasised the fact that tests carried out on lightning protective gear should also be related to operational circumstances. When carrying out impulse testing the arrestor should be also carrying its normal voltage at standard frequency.

Mr. Bodier (France) gave some details of operational experience. Most of the faults due to lightning occurred on lines that were carried on steel or reinforced concrete towers. Existing information and statistics on lightning effects were neither good nor extensive.

A breath of the lecture room was brought into the assembly when Professor Mauduit (France), after mildly reproaching delegates from other countries for not being better acquainted with the graphical method of determining surge levels as explained that morning by Mr. Bodier, proceeded to give a brief but high-speed lesson on the system. Mr. Herlitz (Sweden), who followed, dealt with the protection afforded by cables which, he said, was much less than people supposed.

### *Overhead Lines*

It is perhaps natural that the discussion in this group should largely centre round the possibility of greater economies in line construction. The first approach was through the more exact evaluation of ice and wind loading.

Mr. Mjelstad (Norway) put forward a method of wind pressure calculation based on the product of wind velocity in m/s and diameter in cm, and Mr. Poyart (Fr.) outlined the investigations that were being carried out in France. Wind action is measured by swing recorders for insulator strings and wind tunnel tests have been made on ice formation. Experiences in Sweden and Switzerland were given. Particularly interesting was the statement by several speakers that unloaded lines which might be free from ice, when electrified were subject to ice formations. The discussion clearly showed that interest was widespread in the ratings to be given to wind and ice loadings and a firm belief that with additional knowledge a considerable economy could be made in line construction.

A demonstration of such economy was given by Mr. B. V. Leipoldt (Can.) in his account of increasing the rating of a 135-mile line in Canada from 165 kV to 230 kV. The existing conductors were increased in diameter by an additional layer of wire which raised the dia-

meter from 0·8 to 1·0 in. Two additional insulators were added to the existing ten and in certain cases the towers were reinforced. The cost of these changes was some 50% of a new line. This method of increasing line capacity by extra conductor stranding has also been adopted in Switzerland. A study made in Sweden favoured the use of duplex conductors for increasing capacity but this appears to call for greater tower reinforcement.

A new subject before this group was an investigation by Mr. G. Dassetto (Sw.) into the problem of twisting of overhead cables on unwinding from cable drums. This has not given rise to difficulty in the past with the smaller sizes of conductor, but as larger wires are coming into use it was felt that the problem deserved a special study.

A further major subject under discussion was the maintenance of lines. The technique adopted by the British grid was described by Mr. Schofield (G.B.) while Messrs. Maggi and Niccoli (It.) presented an exhaustive analysis of fault statistics on the Italian Edison system.

The design features of the 275 kV grid were the subject of a paper by Messrs. Lane and Gibbons (G.B.).

## *Towers*

The discussion on towers opened on a similar theme to that on overhead lines, namely concern regarding wind and ice loadings and whether in practice they are as severe as that normally allowed in tower design. Most data have been obtained on short spans but the increasing use of longer spans demands reconsideration of the problem, two speakers suggesting that the factor normally used might be reduced by two to three times.

The most widely discussed paper in this section was that by Mr. W. S. Peterson and Dr. Kanouse (U.S.) in which an empirical formula was given for economical tower design, namely

$W = C\ H_e\ \sqrt[3]{p^2}$,

where

W = tower weight above ground, lb,

He = Equivalent tower height in ft, i.e. height above ground at which maximum resultant pull produces the tower moment,

p = combined transverse and longitudinal pull in lb at maximum loading and broken wire condition,

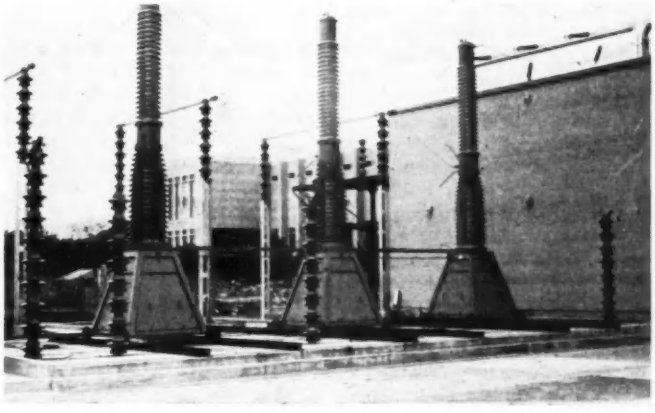
C = constant 0·25 to 0·35 for lines of 110 to 330 kV.

Some of the speakers appeared to read more into the report than the authors intended but in the main there was agreement with it, although Mr. Bianchi (It.) suggested that the constant should be 0·2/0·25. There was some difference of opinion on the use of high stringing tensions and the need for taking into account conditions with one conductor broken.

Experiments with aluminium alloy towers were discussed by Messrs. Percival and Smith (G.B.) and a film shown of the testing of such a tower. These were intended for use in the corrosive atmospheres of industrical areas in Great Britain. They cost some £170 more per tower, which was only justifiable in the worst of conditions.

The question of tower foundations was raised by Mr. H. W. Furlong (U.S.A.). Although American practice favours to a wide extent galvanised steel foundations, the cast-in-situ auger pile has proved successful where conditions are favourable. This utilises truck mounted power augers varying from 1 to 3 ft. diameter, with provision for belling the bottom of the hole. When drilled, the reinforcing rods are placed in position, and the concrete poured. This method has the advantage that the overburden is undisturbed, giving greater strength. The Malone anchor is rarely used now, because of the difficulty of controlling the earth displaced.

Of new types of tower construction, further



*Megrini 3 ph. circuit-breaker*

information was given on the design using tubular members with flattened ends for joining; a method first described in 1950. Further tests have demonstrated the mechanical soundness of the method. The use of prestressed reinforced concrete poles in Algeria was described at length in a paper by Mr. P. Lombard. The use of such poles in that country arose out of the shortage of materials in 1941. Now some 25,000 poles are in use of heights up to 60 ft. There has been no trouble with such poles even when exposed to desert winds. Their reduced weight makes it economically possible to transport them up to 150 km.

### *Cables*

Of those papers dealing with the construction of the cables themselves, that by Mr. C. T. W. Sutton (G.B.) dealt with the latest developments of the compression cable and one by Mr. J. Mollerhoj referred to the flat cable which was described in the ELECTRICAL TIMES, September 7, 1950. A Swedish paper described the 380 kV oil-filled cable installation at Harspranget which has many points of interest. It is designed to transmit 360 MVA in a vertical installation with a height difference of 65 m. This gives a static head of 5·8 kg/cm² and with an oil pressure of 4 kg/cm² at the top, the pressure at the bottom is some 10 kg/cm². The insulation thickness is 33 mm and in addition to the main oil channel, additional channels are provided beneath the lead. The core after standing was drawn down to a round cross-section and a subsequent stranding similarly treated so that any metallised paper round the core was unnecessary and dimensions were kept to a minimum. Mr. B. Hansson, one of the joint authors, referred to the different performances of calendered and softer papers for the dielectric, the former it was claimed increasing the d.c. and impulse strength, but not the a.c. strength, a point on which other speakers, particularly Mr. Williams (G.B.), provided evidence to the contrary.

The fourth paper in this group, by Mr. C. T. Hatcher (U.S.A.), described the development of the low pressure gas-filled cable. This was produced not to improve dielectric performance but to provide continuous monitoring of the cable sheaths for cracks which would lead to breakdowns. This work started in 1938 and in the final cable design a fluted lead sheath is used to provide the gas channels. The general opinion of the speakers suggested that whatever may be the applications of the cable in the dense U.S. networks, there was little scope for its use in Europe.

Several of the papers presented were devoted to cable terminals. That by Mr. L. Domenach (Fr.) discussed the evolution of h.v. cable terminals leading up to a description of the prefabrication of condenser type terminals similar to those used on the 380 kV Harspranget cable. It is fitted to the cable end by unwrapping the cable insulation until the chimney is a tight fit over the end. In contradistinction to this paper, Mr. J. A. Giaro (Belgium) in a theoretical approach provided a new method of calculation for condenser cable bushings having controlled distribution of the longitudinal mean gradients. The method is one of some complexity and of some limitation, but it is supported by tests and provides a new and useful tool.

The shielded type of terminal for h.v. cable may well gain a new lease of life, for Mr. P. G. Priaroggia (It.) in a paper describes a new effort to produce a design suitable for voltages of at least 220 kV. This is based on careful study of the fields involved and the shields necessary to give the required distribution. While the method is simple and overcomes many of the disadvantages, it is not without its own difficulties, one in particular being the care required to centre the cables within the shield.

Significant of the spreading of cable networks to include submarine transmission were three papers dealing with inter-land installation. The first of these employed the flat cable previously mentioned. It is used as a 132 kV link between Denmark and Sweden, the submerged length of which is 5·5 km, out of a total length of 10·5 km. Subsequently a 66 kV cable was laid across the Alssund using a "Pluto" floating drum technique with flexible cable joints. In Holland it is the Wester-Schelde that has been crossed, a width of 5.7 km, the voltage adopted being 50 kV. This is part of the projected Zealand network which will include a further crossing of the river and also two 10 kV submarine cables linking the island of Schowen. The distinctive feature of the Dutch installation is the use of four single-phase cables laid separately. This provides a spare cable in case of damage and allows the manufacture of the cable in longer lengths, but naturally losses are increased. The third paper, by Mr. F. J. W. Bartholomew (G.B.), dealt with the three 33 kV 3-phase cables which have been laid across the Solent; this has already been described in the ELECTRICAL TIMES. Films were shown of the cable laying in connection with the first two papers.

A description of a special design of power cable for submarine use was given in the dis-

cussion by Mr. R. J. Wiseman (U.S.). This uses high voltage rubber instead of paper for insulation, in consequence should the lead sheath become fractured the cable would still function satisfactorily. The cable is manufactured with semi-conducting rubber tape next to the conductor, then the main insulation of high voltage rubber, finally sheathed in nickel alloy and armoured.

The C.I.G.R.E. Study Committee for high voltage cables has prepared a draft specification for low-pressure oil-filled cables up to 250 kV and this was presented by the chairman, Mr. G. J. Th. Bakker (Holland). This prescribes the basic technical requirements other than dimensions and test procedure. The latest recommendation of the C.C.I.F. on protection against corrosion and stray currents were presented by the late Prof. Scoleri (It.).

### *Network Stability*

The opening of the discussion on network stability was by Dr. Mortlock who had some criticisms to make of a paper by S. B. Crary and L. E. Saline (307) on a comparison of methods for improving stability on high voltage systems. Immediately following, all the speakers delved into the question of series capacitors. Mr. Rathsman (Sweden) complained mildly that the Americans had suggested that capacitors should be put at the ends of the lines or at switching stations, but in Sweden the lines were long and they had no intermediate stations so they had to put them half-way between stations. He thought that intermediate switching stations were uneconomic as they only led to more line faults. Mr. Magnien (France) thought that series capacitors were only beneficial for long lines. Mr. Gaussens (France) dealt with flicker caused by the introduction of series capacitors on medium voltage lines where there was a fluctuating load. He thought that the spark gaps across the capacitors should be set for twice the nominal system voltage.

Mr. Shultz (U.S.A.) mentioned the possibility of obtaining severe rotor overheating problems under fault conditions on lines fitted with series capacitors. This was, he said, due to the heavy negative phase sequence currents which could flow due to the lowered system reactance. He gave an interesting example, however, of the use of static capacitors used in conjunction with synchronous capacitors to provide large reactive power at times of fault. This eliminated the need for high-speed excitation and eased the problems of high-speed reclosing.

The question of high-speed reclosing generally then occupied the meeting, Mr. Cabanes (France) claiming that over the last few years the proportion of single-phase faults in France had been as high as 85% to 95%. The peculiarities of the French network led to high-speed automatic reclosing. On stability, he thought single-phase reclosing had many advantages. The duty was less, the maintenance was lower, and the breakers did not need to be so strongly built. They hoped to have about forty lines fitted by the end of this year. The same subject formed the substance of Mr. Robert's remarks, who said that when considering high-speed reclosure the system itself required careful examination. After this digression the discussion reverted to capacitors again, when Mr. Rathsman considered over-voltages. There was a great difference here among available data. More research was needed, particularly in the economic field. He deprecated a suggestion that capacitors could not be improved. There was much more work to be done on them before they were really satisfactory for series compensation.

### *Analysers*

When the subject came round to network analysers and computors, a remarkably wide field opened giving numerous workers a chance to explain in detail various methods and labour-saving devices they had developed. Professor Kapp (G.B.) started the ball rolling by pointing out that it was not much good having a computor if the time saved on the calculation was cancelled out by the time spent in getting the data into a suitable form for the machine to digest. He showed a time-saving formula, whereby it was possible to obtain the value of the line constants without recourse to hyperbolic functions. Prof. Marchal (Belgium) had some words to say on an electronic machine devised in Brussels University.

Dr. Mortlock disagreed with the use of duodecimal computors which gave a direct answer but could not indicate rates of change. Mr. Humphrey Davis mentioned that in his view both analogue and digital computors had a part to play in network problems, and explained a theorem, similar to Thevenin's theorem which had been developed at Imperial College. He said that a computor similar to the Blackburn analyser was being built at the College.

A remarkable slide rule was then produced by Mr. Friedlander (G.B.). This used a mixture of normal and logarithmic scales and had been designed for the manipulation of complex numbers.

Mr. Cahen pointed out that the essence of calculation was time-saving. The engineer in charge of computation should have as many additional aids as possible.

The Chairman also gave some details of the Russian equipment used to study stability problems on their projected 400 kV lines. Small rotating machines similar to the French micro-reseaux were used, with damping windings removable to modify electrical characteristics and with changeable flywheels to alter the mechanical characteristics. Interchangeable rotors were provided to give various reactances. From the available data, it appeared that the installation was specially designed for the Kubishev-Moscow lines and not for general use.

# PAY CLAIM HELD UP

## *Nalgo Conference hears news of latest application*

CONSIDERATION of the application for a 10% increase in salaries for the clerical and administrative grades in the Electricity Supply Industry has been adjourned till later this month, Mr. L. G. Moser, N.A.L.G.O. organising officer for electricity staffs, told representatives at Margate, on Monday prior to the opening of the annual conference of the Association. The claim was put forward in March, but after asking for time to consider the matter, the Boards' members emphasised the effect of wages and salary increases on industry generally and on the electricity supply industry in particular, and appealed to them not to press its claim, he said. This they could not do; they could not overlook the effect of increased costs over the past year, he went on. It was emphasised that they were not commencing a new cycle of claims, but were merely seeking to prevent salaries in the industry from falling farther behind those in comparable services in which increases had been given this year.

They were still convinced that the claim was both justified and realistic and therefore expected to resume negotiations during this month, for, he stressed, there should be no unnecessary delay in dealing with the matter.

### *Overtime*

Earlier, Mr. Moser had dealt at some length with the effect of rising costs since the award last year of increased pay to electricity supply staff. He then went on to refer specifically to two other matters—overtime and the demarcation of commercial staff. Regarding the former, he pointed out that despite pressure throughout the year, the Boards' members had refused to extend payment for overtime above the general clerical and associated scales. The staff side had now decided to seek provision for time off to be granted for unpaid overtime worked—on the lines of the N.J.B. agreement. If this was agreed—and he saw no grounds upon which so reasonable a request could be refused—they would need to watch the position carefully and ensure that the time due was taken in a reasonable period. They had had many battles about the demarcation of commercial staff, said Mr. Moser, and unfortunately the Board were not their only opponents. The E.P.E.A.—quite naturally, because it exists to further the interests of the engineers—was also ranged against them. But in negotiations they had not lost ground. This was not only a question of the right grading for the particular posts, important though that was, nor was it a matter affecting only their people in the Commercial Departments, whose future prospects depended so vitally on the outcome. It affected every one of their members, because it was merely part of the attempt to establish the engineer in a superior position throughout the industry, he added. After referring to E.P.E.A. comments, he said they had every admiration for the achievements of the engineers in their own sphere. But they did not accept that the proper place of the administrative staff was to carry the engineers on their backs as far as non-engineering functions were concerned, whether in the commercial or any other section of the industry.

The many claims for higher pay were also the theme of the address of Mr. Lewis Bevan, president of N.A.L.G.O., at the annual conference on Tuesday. In this he asserted that they did not like making constant claims for increased pay. As an Association they had always exercised restraint in this matter because they knew that, when production remained stable, pay increases contributed to inflation, from which the black-coated worker invariably came off worst.

# Our readers' views ...

## Lighting Installations in Churches

TO comment on Mr. Holt's letter in your issue of the 5th inst., is it not due to the fact that it is almost impossible to install heavy gauge steel conduits with any degree of effective continuity, or without considerable cutting away, behind church panelling that leads to the use of t.r.s. and flexible cords in these positions? The church authorities will not permit the running of conduits on the surface of old and possibly valuable panelling, so what is the installation engineer to do?

Regarding Mr. Holt's point that well-made conduit joints should retain their continuity for the life of the cables, this is not borne out by the recent E.R.A. Report V/T109, "The Incidence and Avoidance of High Resistance Joints in Steel Conduit Runs in Service," and for my part all such runs will remain suspect, even under conditions found in churches. "Megohm's" contention that periodical tests must be made is the right one, although it is difficult to see what can be done if continuity is found faulty, except the drawing in of a special conductor.

In my view, the Central Council would be well advised to follow the lead of progressive installation engineers and permit, or even advocate, the use of flexible non-metallic conduits for church installations, whereby all problems of installation, corrosion, concealment and continuity are completely solved, and at low cost. I can think of no more suitable system for the special conditions found in the average church.

FOLKESTONE *T. C. Gilbert*

◆ ◆ ◆

## Circuit-Breaker Jubilee

IN the article under the above title, printed in your issue of May 8, you say "Both the gas-blast and the oil circuit-breaker were originally developed by the E.R.A. . . ."

I do not for a moment think that the Electrical Research Association would wish to claim the original development of the oil circuit-breaker since, of course, oil circuit-breakers were manufactured and employed long before the existence of the E.R.A. was contemplated. On the other hand, the E.R.A. was certainly responsible for the original development of both the gas-blast breaker and *the side-blast baffle explosion pot*, and an inspection of the section of the latter device, illustrated in your article, will show the strong resemblance between this prototype and modern designs.

*W. H. Date*

THE POLYTECHNIC, LONDON, W.1.

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## Coal Handling

AT the Mechanical Handling Exhibition now being held in London, a method is shown of picking up, overturning and emptying a 16-ton railway truck of coal.

But, a few years before the war, railway traffic officers showed that, with twelve of their 40-ton self-discharging wagons 480 tons of coal could be unloaded in a few minutes—compared with the 8 hours employed by 18 men to unload 48 10-ton trucks. (By tippler, the rate probably does not exceed 200 tons an hour.) The traffic officers then recommended their general introduction.

I have since received letters from the chairmen of some of our biggest industries complaining that they have never yet been able to get the railway management to supply them with these wagons. One of them said that he was so sick and tired of trying to get the railway management to provide them that he had made plans for building them for themselves.

Mr. J. D. Harrison (May 15) says that the Railway Executive informed him that the choice of hoppered or non-hoppered wagons favoured the latter type. Such a statement is, obviously, absurd; as, also, the claim that the manufacturing costs per ton of carrying capacity is 14·75 per cent higher for hopper over non-hoppered wagons. Does the Executive really mean to suggest that it is dearer to build one 40-ton self-discharger (with 8 wheels, 4 buffers, 2 couplings, etc.), than it is to build four 10-ton wagons, with 16 wheels, 16 buffers, 8 couplings, etc.?

The practical railway traffic officers also explained the heavy economies they were making in shunting, train mileage, weighing, labelling, number-taking, repairs, etc., by using 40-tonners.

*E. R. B. Roberts*

ST. NEOTS

*Notes on Wiring*
by MEGOHM

# SMALLER CABLES

## *Polythene insulated and p.v.c. sheathed designs*

WHILST no reference is made in the I.E.E. Regulations for the Electrical Equipment of Buildings (12th edition) to the use of polythene insulated cables for general wiring services in buildings, from reports received, this type of cable is being increasingly used by contractors and public authorities for the internal wiring services in buildings. I understand the position has given rise to some concern and The National Register of Electrical Installation Contractors have approached the British Standards Institution with a view to making public their views on the use of cables of this type, which of course do not comply with the published B.S. for plastic cables.

In view of the fact that reference has not been made to the use of polythene insulated cables in the I.E.E. Wiring Regulations, I venture to suggest that this should not preclude their use, since the Regulations are not intended to put a brake on safe and progressive ideas, which most of us will agree are more than ever wanted at the present time.

### *Specifications*

B.S.I. issued in 1949 a specification for polythene insulated and p.v.c. sheathed cables (B.S. 1557) but certain manufacturers agree that such cables of their make do not comply with the above specification in so far that the thickness of the dielectric is less than that given in B.S. 1557 and the overall dimensions of the completed cable sheath are proportionately smaller. The manufacturers, however, make reference to the fact that in B.S. 1557 paragraph 14, it is stated that the thickness of the insulation may prove to be conservative and from their experience say this has been found to be so. They claim that thermoplastic cables should be regarded not necessarily as an alternative to but an improvement on tough rubber-sheathed cables in view of their superiority in insulation and mechanical properties, and say that the reduced overall dimensions have in practice been found quite adequate.

These cables can be used in locations where t.r.s. cables cannot be satisfactorily installed, such as in the direct rays of the sun, ozone atmospheres and further they are not affected by the action of water, oil and petrol. The cables are recommended as suitable for installation in mine shafts and galleries, tanneries, chemical works, etc. For house wiring polythene insulated and p.v.c. sheathed cables are becoming more in demand, since they are particularly suited for this class of work.

### *Electrical Properties*

The manufacturers claim that the electrical properties of polythene compared with rubber show that polythene provides an insulation resistance more than 300 times that of rubber and the dielectric strength of polythene is in excess of 1,000 volts per mil, which is more than twice that of rubber. The cables at the completion of manufacture are also subjected to pressure tests of 3,500 volts, 50 cycles a.c. for 15 minutes, which again is more than twice that prescribed in B.S. 7 : 1946 for rubber insulated cables and B.S. 1557 : 1949 for plastic cables.

It is well to remember that the thermoplastic materials used in the construction of these cables are produced entirely in this country and an important characteristic is that the p.v.c. sheath applied to the cable and the polythene insulant will not maintain combustion, and when the source of heat is removed from the cable all that remains at the point of contact is charred material. This of course would not be the case if t.r.s. cables were subjected to the same treatment since they will continue to burn.

Polythene insulated and p.v.c. sheathed cables are suitable for use in ambient air temperatures up to 150 degrees F. The makers, however, point out that more rapid dissipation of heat generated is possible due to the lesser wall thickness of the insulant and, therefore, greater overloads may be carried.

It would appear from the manufacturers' statements which no doubt are backed by sound tests, investigations and experience over the past five years, the I.E.E. Wiring Regulations Committee and B.S.I. should get together and give the contracting industry their views on this subject.

# Expanding Domestic Market in Tasmania

*But Low Rainfall Causes Restrictions*

OVER 53% of residential consumers in Tasmania use electricity for cooking, while about 40% of such consumers have an electric hot-water service, it is stated in the report of the Hydro Electric Commission of Tasmania for the year to June 30 last. At that date there were 35,841 electric cookers and 26,593 electric water heaters connected to the Commission's supply. Yet during those twelve months the number of cookers connected was slightly less than the previous year, due to the British rearmament programme.

At the end of last June the Commission was providing a retail supply to 82,545 consumers. Uneconomic extensions embracing supply to 7,543 rural consumers have been approved, and some 5,429 connected. For the latter number, the State contribution towards the capital cost was £279,275, and as a further indication of the expense involved in such extensions, the report adds that the average contribution per consumer towards the capital cost of such extensions completed up to June 30 by the State and the Commission is £68·6.

During the year covered by the report a total of 351 miles of h.t. lines and 231 miles of l.t. lines were erected, together with 16,690 kVA of transformers. The Commission, in fact, was providing a supply in every municipality in the State, except King and Flinders Islands, but a supply for the former has been planned.

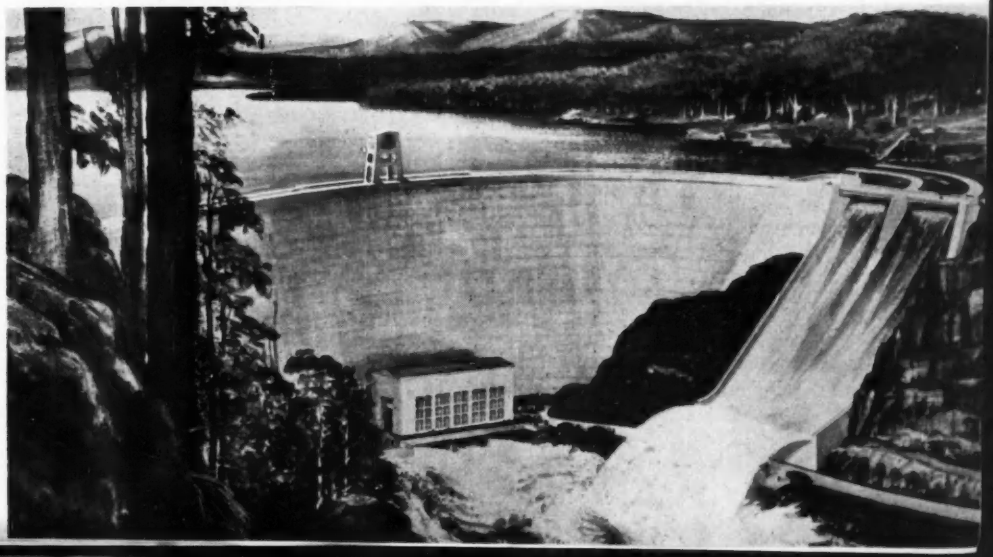
Turning to other results for the year, the report shows that total sales, including bulk supplies, aggregated over 889 million units, compared with 864·5 million in the previous year; income was £177,039 up at £1,646,085, and the net profit £10,279, but it must be remembered that due to a serious lack of rainfall, it was necessary to introduce rationing of power between March and June, 1951, which caused a loss of revenue amounting to £90,000.

That shortage of rain has persisted for a couple of years, and has seriously hindered the expansion of the Commission. At June 30 last, for instance, the total amount of water in storage was only 38½% of capacity. And unless rainfall is substantially above the average the supply position will remain very difficult until new plant is in operation.

## *Station Construction*

New work under construction included Butler's Gorge, Tungatinah and Trevallyn power stations, but the first-named has since been put into operation, as we have recorded. That station, at the foot of Clark Dam, has one 17,000 h.p. vertical turbine utilising whatever head is available in the dam between 81 and 161 feet. The generating capacity of the Commission's hydro-electric system at June 30 was 184,500 kW, but it is estimated that the completion of the Butler's Gorge, Tungatinah and Trevallyn power developments, which together will almost double the present capacity of the system, should prove sufficient to meet demands up to 1954 at least.

*Artist's impression of the completed Clark Dam and Butler's Gorge power station*



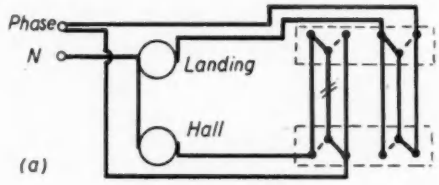
# Problems and Practice

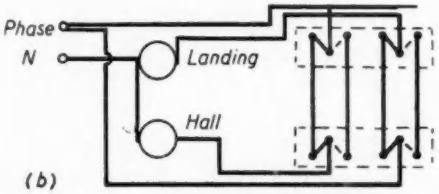
## IN ENGINEERING

### *Decoration Difficulty*

I SHOULD like to make a few remarks on the item headed "Decoration Difficulty" in your May 22 issue. "M.N." has found a happy solution to his problem, but he may be interested to know that he has yet another "life" in case a further core of one of the two three-core cables breaks down.

Diagram (*a*) shows the original connections, and Diagram (*b*) shows a further re-arrangement of the connections in the two boxes, which without disturbing the concealed wiring requires only four sound wires between the boxes.




*Alternative connection for two way switching*

I would, however, suggest that the broken cable should be inspected in between floor spaces as, when one core of a three-core cable is broken, it is quite probable that the other cores may have sustained some damage.—*C. Ludlam, A.M.I.E.E.*

### *A Little Knowledge*

AN amateur electrician had purchased a secondhand 220 V d.c. ½ h.p. compound wound motor with the intention of operating it on 230 V single-phase 50 c/s a.c. supply mains. After his first attempt to carry out this idea, he sent an "S.O.S." asking for an investigation to be made as to why some kind of fireworks display took place inside the motor.

After questioning this person, it was ascertained that he had been advised to disconnect the shunt field winding and run the motor as a series wound machine. However, no thought had been given to any transformer effect which might be set up in the motor, with the result that the insulation of the shunt field winding had been punctured in a number of places. It would appear that the series field winding, of comparatively few turns, was acting as the primary of a current transformer in which the shunt field winding, of a very large number of turns, was acting as the secondary, and had, therefore, a very high voltage induced in it while open-circuited with the result above mentioned. —*E. A. Robbins.*

### *Remote Starters*

REFERRING to Mr. Coull's experience with a starter incorporating automatic overload re-setting (Problems and Practice, issue dated May 15), the burning out of a motor winding as a result of repeated re-closing of automatically controlled circuits under overload conditions is, unfortunately, not a very rare occurrence. I do not, however, agree with the suggested remedy, namely the fitting of a manually operated re-setting starter, which necessitates the attendance of a maintenance engineer every time a temporary overload opens the circuit and shuts down the plant.

The emergency stoppage of such plant, which might involve serious dislocation of production, loss of stock, etc., should only be effected when the temperature of the motor windings has attained an excessively high value with consequent imminent risk of breakdown and possibly resulting fire. The best method of achieving the desired minimisation of stoppages is by using a direct temperature operated cut-out, i.e., a thermostatic protective device either built in or clamped to the motor winding or frame.

Such protection will permit automatic overload re-setting after temporary overloads which have not been maintained sufficiently long to cause excessive overheating; ultimate protection is provided by opening the circuit at a pre-determined maximum winding temperature and preventing re-closing of the circuit until the winding temperature has fallen to a pre-determined safe value.—*S. Spence.*

# IN THE HONOURS LIST

*Mr. L. C. Penwill, C.B.E.*

THE first Honours List of H.M. The Queen, announced last Thursday, contains many of electrical interest. We note the award of a baronetcy to **Mr. Geoffrey Summers,** C.B.E., J.P., D.L., director of John Summers and Sons Ltd., the steel concern; of a Knighthood to **Alderman H. W. Barber,** J.P., in recognition of his political and public services in Southport (Alderman Barber has been for many years manager of the Johnson and Phillips, Ltd., branch for N.W. England at Manchester), and of the C.B. to **Col. A. H. Read,** O.B.E., T.D., D.L., director of overseas telecommunications, G.P.O.

**C.B.E.**—Among recipients of the C.B.E. are **Mr. L. C. Penwill,** director and secretary of the Electrical Contractors Association; **Dr. R. L. Smith-Rose,** director of radio research at the Department of Scientific and Industrial Research; **Mr. W. J. Richards,** chief superintendent, Telecommunications Research Establishment, Ministry of Supply; **Mr. E. J. Bunbury,** M.C., chairman of Oriental Telephone and Electric Co. and other concerns; and **Mr. T. J. Drakeley,** principal, Northern Polytechnic, London.

**O.B.E.**—Those who receive the O.B.E. include **Mr. P. J. Ellis,** managing director, R. B. Pullin and Co. (he has been associated with that company since its foundation); **Mr. K. R. Evans,** manager of the Education Department, Metropolitan-Vickers Electrical Co.; **Mr. Eric Grundy,** manager, Ferranti Ltd., at Moston; **Mr. W. A. Jackson,** director of Telephone Manufacturing Co., who has travelled extensively on behalf of the company, and is keenly interested in educational matters; **Mr. W. McFarlane,** chief generation engineer (operation), South West Scotland Division of the B.E.A.; **Mr. J. F. A. Dimes,** telecommunications controller, Home Counties Region, G.P.O.; **Mr. P. L. Wostear,** lately assistant director, radio production, Ministry of Supply; **Mr. M. Broderick,** lately Regional Director, Midland Region, Ministry of Fuel and Power; and **Mr. J. R. McKerrow,** chief contracts officer, Ministry of Fuel and Power.

**M.B.E.**—The M.B.E. has been awarded to **Mr. F. F. Batcheldor,** works director, Small Electric Motors Ltd.; **Mr. F. A. Binden,** assistant manager, Cable and Wireless Section, London Telecommunications Region, G.P.O.; **Mr. A. Brooke,** lately departmental manager, Crofts (Engineers) Ltd; **Mr. F. G. Diver,** chief engineer, McMichael Radio Ltd.; **Mr. C. E. Dunt,** lately senior clerk, Ipswich district, Eastern Electricity Board; **Mr. H. H. Fell,** mechanical and electrical engineer, Directorate of Works, Air Ministry; **Mr. T. J. Gale,** designer, Pulsometer Engineering Co.; **Mr. J. F. Galloway,** sub-area engineer, Edinburgh, South East Scotland Electricity Board; **Mr. E. Garthwaite,** chief engineer, Marconi Instruments Ltd.; **Mr. J. A. Press,** manager, Bakelite Ltd., at Aycliffe; **Mr. J. Stockwell,** works director, Switchgear and Cowans Ltd.; **Mr. A. H. Watson,** commercial officer, No. 3 Sub-Area (Portsmouth), Southern Electricity Board; **Mr. J. Wedge,** electrical engineer, Admiralty; **Mr. J. Wood,** executive engineer, Research Station, G.P.O.; **Mr. C. E. Nash,** chief draughtsman, Radar Research and Development Establishment, M.o.S., Malvern; **Mr. A. B. Coomer,** secretary of Creed Ltd.; **Mr. D. Macfarlane,** manager, Jig and Tool Design Section, Mirrlees Watson Co., and **Mr. C. J. Lane,** senior executive officer, Inland Telecommunications Department, G.P.O.

**B.E.M.**—The lengthy list of awards of the B.E.M. includes the names of **F. B. Bard,** mechanic-leading man, research laboratories, G.E.C., Wembley; **E. Belshaw,** electrician, North Western Electricity Board, Manchester; **A. Dean,** foreman, turbine room (shift), South Eastern Division, B.E.A. (Portslade); **J. Murphy,** boiler fireman, Yoker power station, South West Scotland Division, B.E.A.; **J. Roger,** chief electrical and mechanical engineer, refractory brickworks, Manuel (Whitecross); **F. Usher,** auxiliary plant attendant, Sunderland, North Eastern Division, B.E.A.; **A. Wilson,** foreman fitter, Dunfermline, South East Scotland Division, B.E.A.

Among overseas awards is that of the C.M.G. to **Mr. E. R. McKillop,** O.B.E., Commissioner of Works, New Zealand.

*P. J. Ellis, O.B.E.*

*E. Grundy, O.B.E.*

*W. A. Jackson, O.B.E.*

*W. McFarlane, O.B.E.*

# overseas news

### Approving Christmas Tree Lights

In future, Christmas tree electrical decorations sold in New South Wales must be approved under new regulations just announced by Mr. Renshaw, the N.S.W. Assistant Minister for Local Government. It is reported that the new regulations provide for electrical appliances and fittings to be approved on a uniform basis in all States. Mr. Renshaw added that the regulations required separate approval for individual types or models of electric articles. Previously in New South Wales, approval covered all models in any one range of articles.

### A Second Port Augusta

A second regional power station, to cost £12 million, is to be constructed at Port Augusta, South Australia, the State Premier, Mr. Playford, announced recently when officially opening the centenary celebrations in that town. He said that a new report by the Mines Director showed that 55 million tons of open-cut coal and 80 million tons of deep mining coal had been proved at Leigh Creek. As a result, the Electricity Trust of South Australia has authorised the preparation of estimates and planning for an extension of the power station at Port Augusta and the necessary transmission and distribution systems. The new station would at least double the capacity of the power house now in course of construction at Curlew Point, he added. A further economic factor in the decision to proceed with a second station was the fact that the Government had been informed it would be required to take a proportion of relatively low grade coal from the western fields of New South Wales. This coal would cost £2 a ton more than Newcastle coal, which was costing £5 4s. a ton. At the present price Leigh Creek coal was a profitable proposition and the costs of producing it were diminishing rather than increasing, Mr. Playford added.

### Melbourne's Profit

Units sold by the city of Melbourne Electric Supply Department during the year ended September 30 last amounted to 211·5 million, a decrease of 1·2% on the previous year, it is shown in the annual report, just received. Mr. B. Woodfull, city electrical engineer and manager, points out that in the six months since the introduction of power restrictions in April, 1951, the sales decreased by over 7 million units (or 6·5%). The maximum demand, too, was suppressed by 16,000 kW. Yet despite such repression, the Department returned a net profit of £28,149 on its activities for the year. Domestic consumption absorbed 20·5 million units, providing an average revenue of 1·951d. per unit, of which water heating alone accounted for 2·8 million units at an average charge of 0·633d. p.u. The cost per unit generated, including fuel, operating and maintenance charges, averaged 1·349d. p.u.

### Franchise Renewal?

Directors of the City Electric Light Co., Ltd., of Brisbane, are confident that in the course of the next few weeks representations to the State Government for a renewal of the company's franchise will have an entirely satisfactory outcome, the chairman has reported to the share holders. From other reports it seems that this is considered an inopportune time financially to bring the company under Regional Board ownership, as it would involve about the whole of the money (£20 m.) that has been allocated to Queensland by the Loan Council for the next financial year.

### Plans Needed

In Manitoba, the Government has reopened negotiations on the electric power question by asking both the Winnipeg Electric Co. and the City Hydro to state their terms upon which they would be prepared to undertake development of any or all of four specified sites—McArthur Falls, Whisky-Jack Falls close to the outlet of Lake Winnipeg into the Nelson River, White Mud Falls also on the Nelson, and the Dauphin River site. In his letters to the two undertakings, Mr. Campbell, the Premier, asked for replies by this week, "as a final decision as to overall policy is imperative at an early date." From local reports it seems that the urgency of the matter is well appreciated, and it is stressed that there should be an orderly plan of development to take care of power demands in the foreseeable future.

### More Buses?

The Montreal Transportation Commission is now studying the question of whether to order a further 100 autobuses and trolleybuses, it is reported. The Commission expects to take delivery in August of some 75 new autobuses and 25 trolleybuses, but with the need for expansion and modernisation, a further order is now contemplated.

### O.H. or Underground?

The question of overhead or underground cables has arisen again in Canada, this time concerning a project in the Moore Park region of Toronto, where the ratepayers have objected to a plan of the Hydro Electric Power Commission

of Ontario to erect a new 115 kV overhead transmission along the back of their properties from the Commission's Richard L. Hearn steam power station to the Bridgeman substation. Meeting a delegation of residents, Mr. R. H. Saunders, chairman of the Commission, explained that part of the line, as planned, would go underground, but the remainder should be overhead. To place that part below ground would cost an extra $700,000, and it would cost $1,000,000 in the future to install a second proposed line underground, and only $30,000 to $40,000 for the overhead route. He suggested the planting of trees and bushes to hide the lines. But the latest shot has been fired by the City Works Committee which has voted to uphold the city's policy that new wiring, where possible, should be placed underground, and has suggested that legal aid be given to the local residents in this present case.

### Those Jo'burg Tenders

The deputation from Johannesburg which recently visited Britain to discuss tenders for plant for the city's new Kelvin power station (details of which we noted last week) came here because of the great variation in the tenders made for the project, Mr. L. M. Weiner, chairman of the city's Tramway and Lighting Committee, has now revealed. When the tenders were opened some weeks ago, in one item alone the difference between the lowest and another tender was nearly £500,000, he said, and it was then decided to send the deputation to discuss the matter with the consulting engineers, Merz and McLellan. While here, the party had been in frequent telephone communication with Johannesburg, said Mr. Weiner, and his committee was satisfied that though the lowest tenders were not accepted, the consultants and the deputation had weighed every aspect of the matter in deciding in the best interests of the city. He also revealed that he had received letters from three of the rejected tenderers questioning the council's decisions. (We noted last week that the tenders of the G.E.C. and Babcock and Wilcox for the generators and boiler plant respectively had been accepted.) Total cost of the accepted tenders is given as £4,168,742.

### Small H.E. Station

A new power station said to be the largest hydro-electric generating station in the Union will be opened in the Eastern Transvaal town of Nelspruit next month. The new power station, with a capacity of 1,500 kW, will augment two others which already serve Nelspruit and its surroundings. One of these is an oil-fired generator and the other is a smaller hydro scheme.

### Coal Supplies

The South African railways and power stations will receive 100% of their coal requirements, according to a statement recently issued by the newly formed Coal Allocation Committee. But as a result there will be a shortage of coal for other consumers and some rationing may be necessary. The statement adds that reserve stocks of coal at some of the power stations are still low, but action is being taken to step up supplies. But local industrialists are viewing the position with some concern, according to reports.

### H.E. Plan for Angola

The Portuguese Government has now approved projects for Angola involving the extension of railway lines and the construction of a hydro-electric plant. The latter is to be located at Matala on the Cunene River and, initially, will supply the town of Sa da Bandeira.

### System Control for Auckland

The Auckland Electric Power Board, New Zealand, has now decided to proceed with its plan for centralised control of street lighting and domestic water heaters. The board has accepted a tender of £29,342 from the Automatic Telephone and Electric Co. for control equipment for street lighting. The same firm will supply water-heating control equipment which will be bought from time to time as needed. But water heater control will be installed only if the State Hydro-Electric Department assures the board that the financial advantages of the scheme will not be offset by changes in the method of determining power charges. That possibility was the unknown factor which worried board members at the recent meeting. The scheme's estimated saving (£55,369 a year for its first five years of operation, £34,370 a year for the second five-year term) is based on the assumption that the Department will continue charging according to maximum demand. By using the equipment to shut off water heaters during peak demand periods the board could reduce its peak and thus reduce costs. But it could continue to sell the same number of units at, it hoped, the same tariff.

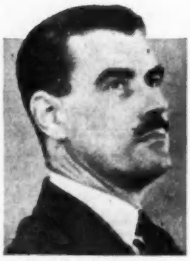
### Jamaica's Expansion

The new hydro-electric power station of the Jamaica Public Service Co., on the Lower White River, was recently inaugurated by His Excellency the Governor of Jamaica, Sir Hugh Foot. Under normal conditions, the new plant is expected to produce about 40 million kWh annually. Total hydro-electric production in Jamaica, based on normal rainfall conditions and the existing hydro-electric plants, is now estimated to be 105 million kWh a year. At the ceremony, the Governor said a recent survey had shown that average electricity charges in Jamaica compared favourably with those in any other Caribbean territory. This Lower White River scheme, together with the new power plant at Hunt's Bay in Kingston, would double Jamaica's power supply. Total investment of capital in the three hydro-electric schemes implemented in Jamaica—the Upper White River scheme, the Roaring River scheme, and this new Lower White River scheme—was more than one million pounds sterling, and a further investment of over half a million pounds was being made in a fourth project—the Hunt's Bay scheme.

# *PERSONALITIES*

## IN THE INDUSTRY

Previously radio and electrical sales supervisor to Kerry's (Gt. Britain), Ltd., **Mr. D. A. Larard,** has now been appointed organisation sales manager of the Radio and Electrical Divisions.



*Mr. D. A. Larard*

**Mr. A. J. Sear** has been appointed managing director of W. B. Dick and Co., Ltd., as from July 1 next—he is now in his 25th year as a director of that company.

**Mr. C. H. Crowlie,** F.I.S.M.A., M.I.EX., export sales manager of Hoover, Ltd., and director, Hoover (Washing Machines), Ltd., left on Monday last for Australia, for discussions with the Australian company concerning present marketing conditions. From Australia, he will fly to the U.S.A. for talks with the company's Associates there. His round-the-world journey is expected to take a month.

**Mr. V. Y. Kamat,** head of Kamat Brothers, Bombay, and a past president of the Indian Electrical Contractors' Association, Bombay, left that city recently on a six-month business tour, during which he plans to visit Italy, France, Belgium, the United Kingdom, Germany, Holland, Sweden, and Denmark.

Last Sunday **Mr. Ivan Stedeford,** chairman of Tube Investments, Ltd., left England by air for Canada for consultations with the associate company, Standard Tube and T.I., Ltd., and to observe at first-hand general industrial trends in North America.

**Lord Citrine,** Chairman of the B.E.A., recently visited several of the North Western Division's new stations and plant. In company with his personal technical assistant, Mr. E. Scott, visits were made to Trafford where the 15 MW gas turbine was inspected, also Carrington and Chadderton. Lord Citrine was accompanied on the tour by the Division's chief officers who deputised in the absence of the controller, Mr. A. R. Cooper, who was away on business at Headquarters, London. Our accompanying photograph, taken at Carrington, shows Lord Citrine discussing building plans with, left to right, **Mr. J. L. Ashworth,** chief generation engineer (O), **Mr. J. B. Ludlam,** welfare officer, and **Mr. J. Shepherd,** construction engineer.

Newly appointed manager of the Heston district of the Southern Electricity Board is **Mr. J. C. Fitzmaurice,** M.I.E.E., who has been with the London Electricity Board. He took over last week from **Mr. S. H. Fowles,** M.I.Mech.E., M.I.E.E., who, we noted in our November 22, 1951, issue, would retire from the Board's service when a new district manager was appointed. Mr. Fowles leaves at the end of this month to commence his consulting business. Mr. Fitzmaurice was educated at Hackney Technical Institute and the Regent Street Poly'. He joined the St. James and Pall Mall Electric Light Co. in 1927, and after a period of practical training, became successively junior engineer and charge engineer with that company. He subsequently served with the Central London Electricity Co. as mains and station engineer and later as senior development engineer. During the war he was seconded to the M.A.P., serving for 3½ years as deputy officer-in-charge of a radar factory on the south coast. After nationalisation of the supply industry he became deputy manager of the London Electricity Board's Fulham district, and in a subsequent appointment—as engineering section head—he acted as personal assistant to the manager of the London Board's Western sub-area.

*Mr. J. C. Fitzmaurice*

**Mr. Arnold Watson,** O.B.E., general manager of Castrol sales for the last four years, has been elected to the board of C. C. Wakefield and Co. Ltd.

*Building plans under keen examination at Carrington generating station*

**Mr. J. H. Maxwell** has been appointed sales manager of W. T. Glover and Co. Ltd. Mr. Maxwell joined the company in 1910 and, with the exception of three years with the Royal Navy during the first World War, has been in the service of the concern since that date. As estimating manager he became well known on the commercial side of the cable and electrical supply industries and he brings to bear in his new responsibilities a wide experience and a distinguished record of past achievements.

*Mr. J. H. Maxwell*

**Mr. F. N. Rush** has joined the Edison Swan Electric Co. Ltd., as street lighting sales engineer. Formerly, he was many years with Metropolitan-Vickers Electrical Co. Ltd., latterly at the head office in London, being there concerned with lighting. He is a former member of the Council of the Electric Light Fittings Association.

At the annual meeting of the Institute of Physics last Thursday, **Dr. C. Sykes,** managing director, Thos. Firth and John Brown, Ltd., was elected president. **Mr. O. W. Humphreys** and **Dr. T. L. Ibbs** were elected vice-presidents, and **Dr. S. Whitehead** was elected honorary treasurer. In addition **Dr. B. P. Dudding** was re-elected honorary secretary. The new ordinary members of the Board elected were **Mr. H. Barrell, Dr. N. A. de Bruyne, Dr. W. H. Taylor,** and **Mr. R. G. Wood.**

Our photograph below, taken at the recent cocktail party given at the Savoy Hotel by **Mr. A. G. Clark,** chairman and managing director of the Plessey Co., Ltd., on the occasion of the return to London of **Mr. and Mrs. John A. Clark,** after their marriage, shows **Mr. E. J. Emery,** managing director of E.M.I. Sales and Service, Ltd. being greeted on his arrival.

*Mrs. Clark greets Mr. Emery*

**Mr. A. W. A. Dick-Cleland,** M.I.E.E., a director of Lancashire Dynamo Holdings Ltd. and joint managing director of Lancashire Dynamo and Crypto (Mfg.) Ltd., is to make a business tour of East and South Africa and Rhodesia, leaving this country by air tomorrow, June 13. Apart from calling on important customers and the Company's agents in East Africa he will visit Lancashire Dynamo and Crypto South Africa (Pty.) Ltd. of Johannesburg and agents throughout their territory, returning to this country by sea from Cape Town on August 1 next.

*Mr. Dick-Cleland*

Just arrived in Britain by air from the Far East is **Mr. C. C. Payne,** M.I.E.E., M.Amer.I.E.E., municipal electrical engineer to the Singapore Municipal Electricity Department. He is here in connection with the plant on order for the new Pasir Panjang power station, and also the recruitment of staff for that steam station. An unusual feature of this new station is that it is to have a 2,000 kW gas turbine driven alternator as a house set for the first stage of 50 MW. Details of further posts still vacant for the Pasir Panjang station are advertised in our classified advertisement pages elsewhere in this issue. It is expected that Mr. Payne will remain in this country for a few weeks and will interview many of the applicants.

We understand that **Mr. W. L. M. French,** A.M.I.E.E., M.Inst.F., has left the British Electricity Authority to take up a position as engineering inspector in the Electricity Division of the Ministry of Fuel and Power. Mr. French received technical education at Leeds College of Technology and served his engineering apprenticeship with Leeds Corporation Electricity Department, and was afterwards appointed combustion engineer and later shift engineer at Kirkstall power station. Between 1940 and 1945 he was a senior shift charge engineer in the Power Department of I.C.I. (General Chemicals) Ltd., at Weston Point station, Runcorn. From 1945 until the present time he has served with the London Power Co. at Deptford East and Battersea generating stations, and also with the Hackney Borough Council, where he was the boiler house superintendent. For the last four years he has been assistant boiler house superintendent at Battersea, London Division of the B.E.A.

*Mr. W. L. M. French*

In continuation of the Brush Aboe Group's policy of maintaining the closest contact with export markets, senior executives are visiting agents and customers in many parts of the world. **Mr. B. H. Mears** has just left for an extended visit to Canada; **Mr. I. Macleod-Smith** has gone to the Sudan, and later will visit Syria, Lebanon, Turkey and Iraq; and **Mr. Frank A. Vaughan** left early in June for a tour of Egypt.

J. H. Tucker and Co., Ltd., announce the appointment of **Mr. E. R. Faulds** to assist their Scottish manager, Mr. S. G. Smith. Mr. Faulds is resident in Edinburgh and will cover the East of Scotland Area. The company has also appointed **Mr. H. Finch** as area manager for the North of England. For the time being he will concentrate on the North Western Area and will have assisting him **Mr. J. D. Green** as district sales representative covering Yorkshire and the North East Coast.

Ewbank and Partners Ltd., engineering consultants, announce that **Mr. G. E. Wheeler,** M.I.Mech.E., M.Inst.Pet., has joined their organisation in full consulting capacity prior to going on to the board at the end of the year. Mr. Wheeler had previously been in the service of the Anglo-Iranian Oil Co. Ltd. for some twenty-seven years, having held the post of works manager, Abadan, and at the time of leaving their service was manager, Engineering Division, Refineries Department, London.

**Mr. W. M. B. Furniss,** assistant managing director of the Electric Construction Co. Ltd., recently returned to this country after a business visit to South Africa. He spent nearly three weeks in consultation with the company's representatives, Hubert Davies and Co. Ltd., who are responsible for the sales of E.C.C. rotating electrical machines in South Africa, South West Africa, Bechuanaland, Southern and Northern Rhodesia, Portuguese East Africa, Nyasaland and the Belgian Congo.

Following the success of the prototype machine designed by **Mr. A. R. Cooper,** M.I.E.E., M.Inst.F., Controller of the North Western Division of the B.E.A., to enable both blind and deaf persons to read Braille on a typewriter-like keyboard (to which we have earlier referred), Mr. Cooper has now designed what is, in effect, a pocket model of his machine, we hear. The Carnegie United Kingdom Trust has agreed to defray the cost of an experimental twelve of these small alphabet-into-Braille machines, we hear. Mr. Cooper's efforts in this venture will be warmly applauded.

In the London students' section of the I.E.E., the following have been elected as officers of the committee for the 1952-53 session: chairman, **Mr. B. L. A. Ellings** (London Division, B.E.A.); vice-chairman, **Mr. M. H. Alder,** B.Sc.(Eng.) (Standard Telephones and Cables Ltd., New Southgate); hon. secretary, **Mr. R. Thomas** (Sperry Gyroscope Co. Ltd.); hon. asst. secretaries: general, **Mr. M. C. Cubitt** (Croydon Engineering Co.); visits, **Mr. A. R. Telford** (University College); entertainments, **Mr. R. G. Katesmark,** B.Sc.(Eng.) (L.E.B.); and **Mr. D. A. Sowter** (King's College); section editor, **Mr. K. W. Wardrop,** B.Sc.(Eng.) (B.E.A.); and hon. treasurer, **Mr. A. W. Hough-Grassby,** B.Sc.(Eng.) (Queen Mary College).

New appointments in the sales-service organisation of Hoover Ltd. are announced. **Mr. I. F. Carter,** formerly manager of Tottenham district, is to be staff training manager; and **Mr. J. L. Pizzey,** previously staff instructor at the company's Bristol sales-service training school, is now the district manager at Tottenham.

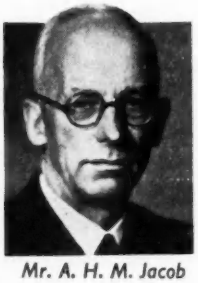
## OBITUARY

**Mr. P. H. Jackson,** M.I.E.E., managing director of the Birmingham electrical engineering concern of that name, died on June 8, aged 67. He was also a former consultant to John Garrington and Sons Ltd., of Bromsgrove. Earlier he spent 15 years with the General Electric Co. Ltd. at Witton, chiefly on switchgear design.

**Mr. E. K. Muir,** M.I.E.E., industrial officer, electrical engineering, to the Council of Industrial Design, died on June 6, aged 70. His connection with the electrical industry dated back to the early 1920's, when he was manager of the London office of Metrovick Supplies Ltd. From 1930 to 1936 he was general sales manager to J. H. Tucker and Co., but he subsequently rejoined the A.E.I. group, being attached to Ferguson Pailin and, later, the Hotpoint Electric Appliance Co. From 1941 to 1949 he was with the Ministry of Supply, latterly as senior production officer, Directorate of Power Station Equipment, London. He has been vice-president of the Electrical Trades Commercial Travellers Association, and also served for many years on the accessories section of B.E.A.M.A.

**Mr. G. Wilson,** LL.B., assistant secretary of Ministry of Fuel and Power, died on June 6, aged 54.

**Mr. A. H. M. Jacob,** Comp.I.E.E., an executive director of W. T. Henley's Telegraph Works Co. Ltd., died on June 3, aged 62. He joined Henley's in 1906, the first seven years of his service being in the Accounts Department. In 1913 he was appointed assistant to the late Mr. A. E. Salmon who was then secretary to the company, and in 1926 he succeeded him as secretary, which office he relinquished in 1947 when he was appointed a director of the company. He also served on the Boards of all of the Henley subsidiary companies, and had served on the boards of both the Antrim Electricity Supply Co. and the Antrim Electricity Distribution Co.



*Mr. A. H. M. Jacob*

# Showroom for Strip Lighting

FOR many years the firm of Linolite Ltd. has specialised in the manufacture of tubular filament lamps, and in view of increasing demand, last week opened a Showroom in London. This, a unique event in the firm's history, is devoted wholly to lighting fittings employing this type of lamp.

*The new Linolite showroom viewed from door*

Arranged to show their wide scope, wall panels on either side display uses to which these lamps can be put. Domestic fittings for living-rooms exhibit a variety of style to satisfy consumers' differing tastes, and, displayed on one side of the showroom, are offset by designs suitable for bed- and bathrooms on the other. The well-known "Edgelight" type of fittings and other examples of Linolite products are situated on shelves and stands round the sides of the room. Several of the lamps are shown providing special illumination for particular subjects, such as mirror lighting and the illumination of a painting of the company's works at Malmesbury.

The new showroom was officially opened by Mr. A. W. Beuttell, M.I.E.E., F.I.E.S., governing director of the company, who welcomed the guests, after an introduction by Mr. L. A. Fickling, the sales manager. There is no doubt that this showroom will provide a centre for those interested in this particular style of lighting.

# *G.W.B. Comes of Age*

EARLY in 1931, the firm of G.W.B. Electric Furnaces came into existence as a result of an agreement between Gibbons Bros. Ltd. and Wild Barfield Electric Furnaces Ltd. The first order received by the company was for a box-type sheet annealing furnace for the Northern Aluminium Co., Ltd. This paved the path for a long association with the aluminium industry, which has now reached the point where G.W.B. are the foremost suppliers of electric furnaces for the heat treatment of light alloys as they come of age as a company with 21 years of manufacturing behind them.

Perhaps the most impressive installation supplied by the company to date has been that for the new continuous strip mill at the Rogerstone Works of the Northern Aluminium Co. These two large preheating furnaces are each rated at 3,750 kW and have a capacity of 100 tons of aluminium in a chamber 56 ft long by 10 ft wide by 7 ft high.

Other furnaces have been supplied for ferrous and non-ferrous heat treatment in the automobile, aircraft engineering and sheet metal industries. Present developments include G.W.B.'s entry into the arc-furnace field and induction heating equipment. On medium frequencies, a mercury arc rectifier is being used as a means of frequency changing. Many special products for use in conjunction with case-hardening are made, and an important secondary occupation is the manufacture of electrode-type steam raisers and water heaters.

*These rectangular bell furnaces used for annealing of silicon steel sheets, are typical of the company's products*

# Yorkshire Standard Tariff

SLIGHT amendments have now been made to the standard domestic tariff originally proposed by the Yorkshire Electricity Board following protests from the Area Consultative Council. Details of the original proposals were given in our December 21, 1950, issue, but the new tariff, which has been approved by the Consultative Council, has a three-block sliding scale. The primary units, again assessed according to the number of rooms, are to be charged at 4⅛d. p.u. with a secondary rate of ⅞d. and a follow-on rate of ¾d. p.u.

In calculating the number of primary units, for the first two rooms there are 18 units p.q., for the next four rooms 9 units per room p.q., the next six rooms 12 units per room p.q. and the next four rooms 15 units per room p.q. The secondary block of units, at ⅞d., vary from 232 p.q. for two rooms, 768 for five rooms and up to 5,064 for 16 rooms or more. All units in excess of the combined primary and secondary blocks are charged at ¾d. p.u. Pre-payment consumers pay 2s. 6d. p.q. extra.

It may be recalled that when the original standard domestic tariff was put forward the Consultative Council objected, and urged that the Board's accumulated reserves should be used to mitigate such disturbances. The Board refused to accept that contention, and the Council's subsequent appeal to the B.E.A. was also rejected.

This amended tariff will operate after July 15. From that date, too, increased rates on other tariffs will apply. For consumers other than domestic, on tariffs without a fuel clause, the rate is increased by ⅛d. p.u. (with a maximum of 4⅛d.). The unit charge under industrial and commercial tariffs (minus a fuel clause) is also raised by $\frac{1}{16}$d. and discounts for prompt payment are now discontinued.

# *Diamond Ore Dried by Infra-Red*

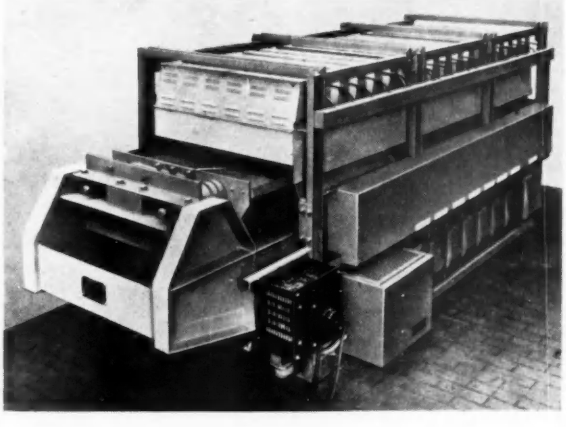
AFRICA will soon be importing from this country diamond ore driers employing infra-red heating, developed and manufactured by the Fraser and Chalmers Engineering Works of the General Electric Company Ltd.

Simplicity is the keynote of operation. Diamond ore concentrates, from a heavy media separating plant pass, at a rate of 500 lb/hr, along the tray of a "Sherwen" electro-magnetic vibrating conveyor in a level and even layer. High speed, low amplitude vibration is produced from a single unit which by a.c. supply, powers the conveyor, employing a pulsating current derived from half-wave rectification. Rheostatic control of the current provides a convenient method of varying the amplitude of vibration and hence the speed at which the ore travels along the tray.

For almost the whole length of the tray, which measures 10 ft by 3 ft, heat from Osram infra-red lamps is directed onto the ore. 108 lamps in all are housed in eighteen standard G.E.C. infra-red heating reflector units of special aluminium alloy surrounded by side reflectors of the same metal, and present a load of 27 kW. Additional heating is supplied by auxiliary tubular heaters mounted beneath the tray, making a total heating capacity of 36·75 kW.

Wiring is minimised by the use of busbars from which single phase supplies for the heaters and conveyor are taken through triple pole switch fuses. The busbars are supplied from a 415 V 3-phase 50 c/s a.c. supply via the main switch box.

*The Infra-red drying machine viewed from the feed end. A hopper, not shown here, supplies tray with ore*

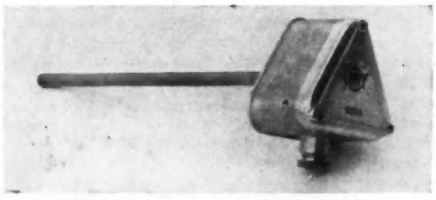


# *The* BUYER'S *Column*

## A Watertight Thermostat

INTRODUCED to the trade this week by UNITY HEATING LTD., Chilworth Manor, Southampton, is a new watertight (stem type) thermostat to which the company have given the code number 4130.

For a.c. supplies up to 250 V the thermostat can handle up to 15 amp, working through a temperature range of 30° to 90° F. Finish of this Evenwarmth model is aluminium. Its weight, 1 lb 8 oz, and dimensions overall: box, 5 in. by 4 in. by 2 ½ in.; stem, 11 3/16 in.; and its list price £2 15s.



*Code No. 4130—Unity Heating's latest watertight thermostat*

## Price Changes and Sales Policy

NEW prices for Altas tungsten lamps and fluorescent tubes, operative from June 1, 1952, are the subject of a recent notice by THORN ELECTRICAL INDUSTRIES LTD., 105-109 Judd Street, London, W.C.1.

These are as follows: 200-260 V single coil, pearl and clear lamps: 15 and 25 W, 1s. 5d.; 40 and 60 W, 1s. 3d.; 75 W, 1s. 8d.; 100 W, 1s. 9d.; 150 W, 2s. 6d.; 200 W clear, 3s. 9d., pearl 4s. 3d.

Double-life fluorescent tubes: 80 W, 5 ft, 13s.; 40 W, 4 ft, 11s. 9d.; 40 W, 2 ft, 11s.; 30 W, 3 ft, 11s.; 20 W, 2 ft, 10s. 6d.; 15 W, 1½ ft, 9s. 9d. All prices subject to purchase tax at 22¾%.

A copy of a leaflet issued by the GENERAL ELECTRIC CO. LTD., Magnet House, Kingsway, W.C.2, gives details of price changes for Osram lamps and tubes. The fluorescent lamps are reduced by amounts ranging from 1s. 9d. to 2s. 6d. per tube. But the prices of g.s. lamps and other filament and discharge lamps are increased as foreshadowed in recent E.L.M.A. notices.

Following similar announcements by EKCO-ENSIGN ELECTRIC CO. LTD., Southend-on-Sea, Essex, the company also announce a new sales rebates policy as follows:

1. Rebates will be calculated on nett turnover (less purchase tax) in all lighting products, including: Tungsten filament lamps; fluorescent lamps; fluorescent fittings, control gear and accessories; and Tungsten filament lamp industrial and commercial fittings.
2. They will also be calculated on the combined purchases of the above lighting products of both the Ekco-Ensign and Atlas organisations.
3. Rebates to resellers will be paid annually on direct purchases or purchases through wholesale distributors.

The favourable discount arrangements remain unchanged.

## Gibson's New Tower Ladder

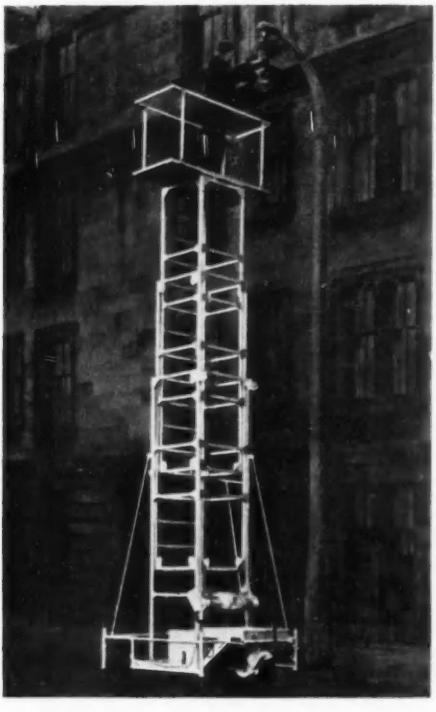
MOBILE tower ladders suitable for street lighting, structural work, decorating, etc., have been developed by JOHN GIBSON AND SONS LTD., Jameson Place, Leith, Edinburgh.

Particularly interesting is the new electric tower, which is based on a Graiseley pedestrian-controlled tricycle-type electric truck, powered by D.P. Kathanode 24 V traction batteries. This chassis is fitted with levelling jacks, parking lights, side lightings and pneumatic-tyred wheels.

Batteries are suspended centrally in the chassis, the charging rates for these have been pre-set for automatic control for a "Legg" battery charger.

Tower frames are of aluminium alloy. The tower itself extended is 22 ft 6 in. from 9 ft closed. Raising and lowering is effected by a hand-operated David Brown winch gear, whilst the normal safety requirements have been observed.

*Gibson's tower ladder is self-propelled*



## Dowmic Sequence Switch

THE Dowmic sequence switch, designed and produced by DOWTY EQUIPMENT LTD., of Arle Court, Cheltenham, is a studied effort to eliminate all types of defect and incorporate features which contribute effectively to reliability and efficiency in the operation of modern aircraft. This switch is employed to signal the completion of a function such as raising or lowering the aircraft undercarriage and opening or closing fairing doors and to initiate the operation of one or two subsequent events on the completion of an antecedent one.

The switch is metal-cased and totally enclosed with cable grommet and button shroud made in petrol- and oil-resistant synthetic rubber. This grommet provides for the entry of the six cables at one end of the case, thus facilitating wiring.

The double-pole changeover contacts enable two separate circuits to be switched; this feature quite frequently enables the Dowmic switch to replace two switches of the earlier types. The Dowmic has an overtravel of $\frac{1}{8}$in. and this not only ensures safe operation by members of large or small mass, but eliminates the need to pack the switch to make contact with the operating member.

*Dowmic's sequence switch weighs 4¼ ozs*

The actual load to operate the switch is 8 lb but it will withstand an overload of 1,500 lb. The make and break action functions with normal speed, but the design increases the contact pressure up to the instant of break.

Though primarily designed for use in aircraft circuits, the Dowmic sequence switch is equally suitable for use in industrial applications.

The switch rating is 8 amps per contact set, 16 amps total at 28 V d.c. or 250 V a.c. (0·15 henrys inductance in each case).

## Dual Voltage Arvin Shaver

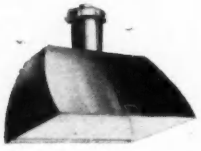
NEW model of the Arvin de Luxe shaver, produced by ARVIN ELECTRIC LTD., Fernbrook Avenue, Southend-on-Sea, Essex, is now in production.

It is the dual voltage D.S.7X model which embodies the same virtues as the de luxe model D.S.7A, but has in addition a built-in voltage selector enabling the model to operate either on a.c. or d.c. 100/130 V or 200/250 V. It is packed in the Arvin "Wind-a-pak" presentation case.

Selling price of the Arvin de Luxe dual voltage model is fixed at £5 10s. (including £1 1s. 9d. purchase tax). Retail discount remains at 30%.

## Lighting Race Tracks

LATEST development by BENJAMIN ELECTRIC, LTD., Brantwood Road, London N.17, is a lighting fitting especially designed to be suitable for both greyhound race tracks and speedway tracks.



The deep screening of the fitting provides comfortable and clear vision for spectators and at the same time provides uniform brightness on the track itself.

The firm consider that these fittings are ideally suited for mounting on a swivelling pole standard, so that they can be used to illuminate whichever track is in use.

For use with 1,000 W or 1,500 W 9.5 lamps with G.E.S. porcelain lampholders fitted on suitable bosses, the fittings comprise a main reflector and neck in "Crysteel" vitreous enamel, white inside and grey outside, with inner reflectors of "Brytal" anodised aluminium. One reflector is fitted at each end to project light up and down the track, whilst the third is fitted at the back of the fitting (nearest the pole) to throw light across wide tracks.

Fittings are available with cast light alloy flanges either top entry tapped 1-in. gas or alternately side entry to take 1$\frac{3}{8}$-in. o/d conduit.

## Ashley Accessories Festoon Lampholders

THE sizes of cable to fit this lampholder which we mentioned in our issue of May 15, 1952, should read 3/·029, 7/·029 or 7/·036 twin flat T.R.S. cable, not as was unfortunately printed, 3/·039, 7/·039.

## The Hoover "Glassmaster"

THE "Glassmaster" electric glass washing machine, designed and produced by HOOVER LTD., Perivale, Middlesex, has been awarded the Certificate of the Royal Institute of Public Health and Hygiene.

## TRADE PUBLICATIONS

DIESEL ENGINES.—A data sheet for the R.K. range of diesel engines has been issued by the English Electric Co. Ltd., Queens House, Kingsway, W.C.2.

LIGHTING AND FITTINGS.—Two new catalogues have recently been published by the General Electric Co. Ltd., Magnet House, Kingsway W.C.2, giving details of their new contemporary and Chrysaline fittings.

WELDING.—The Quasi-Arc Co. Ltd., Bilston, Staffs, have now produced a revised edition of their instruction book for electric arc welding. This 68-page booklet describes the arc welding of mild steel in all positions, the text being supplemented by numerous photographs and diagrams.

# The WEEK in NEWS

## Joint Payment of Accounts Proposed

***Electricity and Gas Bills may be paid at Same Office***

RECOMMENDATIONS that there should be joint reading of both electricity and gas meters have been made by numerous bodies throughout the country during the past few months. Many of those suggestions incorporate the payment of both bills at the same time, and this latter proposal has recently been echoed by the N.E. Gas Consultative Council. Such a practice is in operation at Leeds, and has been since vesting day, although permission for its continuation has to be sought annually, and it is felt that if the arrangement works smoothly there, why not elsewhere. The Northern Gas Board have stated that the matter is being considered, but is at present only in the planning stage.

The North-Eastern Electricity Board have commented that test areas have been established for joint meter reading (see our May 22 issue), but no provision is yet being made for joint billing.

## GAS OPERATED POWER STATIONS

ADDRESSING the National Association of Colliery Managers' annual conference at Newcastle-on-Tyne recently, Mr. C. O. Masterman, technical director of Underground Gasification at the Ministry of Fuel and Power, said steps should be taken to design new power stations for operation by gas or heat energy obtained from unminable coal. Mr. Masterman who was referring to the gasification of coal seams said that sooner or later, a power station of that type would have to be designed to see whether it would be an economic proposition. If power stations could be used in this way, they would provide a contribution to the fuel and power resources of this country, he said. Mr. Masterman added that there were hundreds of millions of tons of coal which could be used by underground gasification.

## Copper Sales Halted Beyond June 30

AS a result of the confusion which has arisen over the world price of copper, the Ministry of Materials has announced that copper sales have been stopped for the period following the end of June pending clarification of the situation. Making the announcement last week-end, the Ministry said another statement would be issued within a week. Sales against consumers' June orders are not affected.

The majority have regarded the New York net price as the world export price, but recently the U.S. agreed to pay Chile more—hence the confusion.

## *Committee re-formed to consider Merchandise marks*

A STANDING Committee has been appointed for the first time since 1939 under the Merchandise Marks Act of 1926. Under section 2 of that Act applications may be made to the Board of Trade to recommend the making, amending or revoking of Orders in Council requiring imported goods to be marked with an indication of origin. Applications may also be made for provisional exemption from existing Orders in Council. Agricultural and horticultural produce and the produce of any fishing industry do not come within the scope of the Act.

The Committee of four just appointed consists of Sir Guy Locock, chairman, Miss E. T. Dowling of the B.o.T., secretary, and Mr. C. B. Dyson and Mr. J. A. Birch. Meetings lapsed on the outbreak of the recent war and are being revived following renewed interest on the part of traders. Applications should be addressed to the Secretary, B.o.T., Industries and Manufacturers Div. 2, Horse Guards Ave., S.W.1.

## *The First Half-Century*

A delightful communication comes from Mr. Darke, an old gentleman of over eighty, who had the misfortune to fall on the rails of the City & S. London at Kennington station. I quote his experience: "In attempting to rise I grasped the conductor, and had some 400 V playing through me. I lost consciousness. feeling death inevitable. I recovered somewhat on being lifted on the platform by two porters who dressed my wounds, notwithstanding which I experienced no headache nor other inconvenience, and was soon enabled to travel home; and though now in my 83rd year, am happily free from rheumatism, to which I was before subject. I am therefore under the impression electricity, *judiciously administered*, is beneficial in acute cases of rheumatism and nervous complaints." The italics are Mr. Darke's. His idea of judicious administration is rather drastic, but he is to be congratulated on the effectiveness of the cure.—*From our issue of June* 12, 1902.

## OFFICIAL PUBLICATIONS

BRITISH STANDARDS
B.S.1650: Parts 2 and 3: *Capacitors for connection to power-frequency systems. Amendment Slips;* P.D.1381 to B.S.108: *Graphical symbols for electrical purposes:* P.D.1388 to B.S.1332: *Guide to civil aerodrome lighting:* P.D.1392 to C.P.413: *Design and construction of ducts for services:* P.D.1403 to B.S.1767: *Grommets for general purposes.*

ELECTRICITY SUPPLY (METERS) BILL. H.M.S.O., 2d.

PATENTS, DESIGNS AND TRADE MARKS. *69th Report for* 1951. H.M.S.O., 1s.

BRITAIN'S SHOPS. *Statistical summary of shops and service establishments.* H.M.S.O., 3s. 6d.

## M.E.B. SUED AFTER FIRE IN HOUSE

DAMAGES for negligence amounting to £237 12s. 6d. are being claimed against the Midlands Electricity Board, following a fire in the claimants' house in July 1950. It is alleged that the cable supplying electricity to the house was so constructed that it broke down and caused the fire. The deputy chief fire officer of Shropshire has stated that in his opinion the fire's origin was an electrical one, and started where the cable entered the house. It was not protected at this point. The metal sheath was wide enough to admit moisture, and the gap in the wall big enough to take two cables. The officer stated he was appalled at the bad workmanship of the installation. The case has been adjourned until next month.

## *FOUR POINTS IN DEFENCE OF ELECTRICITY*

LATEST participator in the debate on the proposed national fuel policy is Mr. S. F. Steward, chairman of the S. Western Electricity Board, who joined the dispute in his talk to the Cornwall Electrical Group at Newquay last week. Having warned his audience that the country would step back half a century if critics wishing to curb the use of electricity had their way, he said it seemed as if, because the industry had such a good product and so excellent a case, electrical development had been taken for granted and no effort made to publicise it.

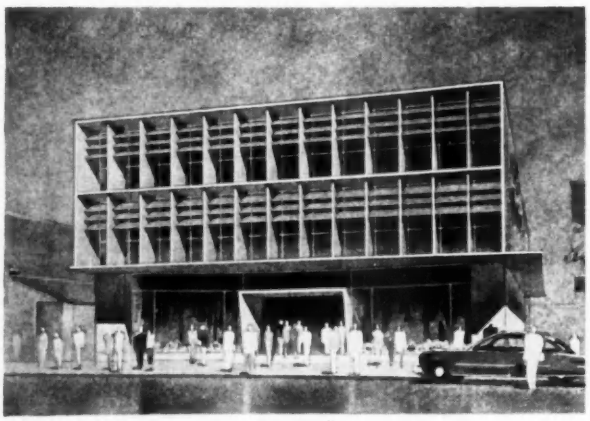
In the course of his address Mr. Steward made four points. Experience, had shown, he said, that consumers' freedom of choice, with stimulating competition, was the best method of discovering the most efficient and economic use of fuel. Increased use of electricity in factories, offices and homes had largely been a substitution for less efficient uses of fuel. In addition, the industry itself had improved its own efficiency. He went on to emphasise that electricity was the lifeblood of Britain's industry; without it the country would lose its place as a great industrial nation. He added that the expansion of electricity supplies to industry would avoid much of the present inefficient use of fuel.

Having pressed the point that power stations were contributing to fuel economy by using the lowest grades of coal, Mr. Steward referred finally to the housewife. It was she who would probably have the last word, he said. She could be relied on to strike the most economic balance in her use of fuel providing the industries indulged in healthy competition. The housewife could not afford to waste fuel at present, and she may well insist also that the nation's fuel policy takes into account the need for a higher standard of cleanliness and freedom from air pollution.

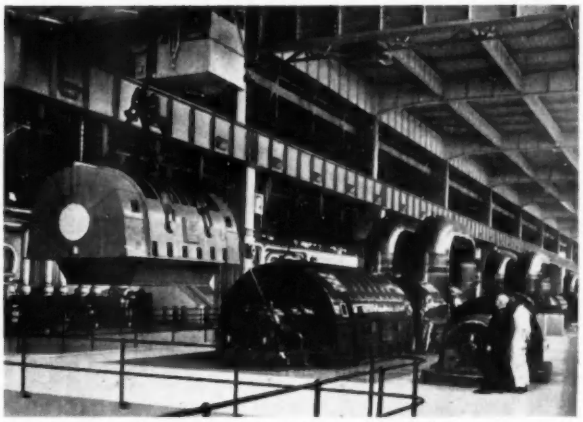
## New Co. to Machine Hard Materials

A NEW company has recently been formed and registered under the name of Sparcatron Ltd. It will be concerned with the granting of licences under the Rucorff and other patents, for the application of the new process of electronic machining of materials. The company has set up laboratories for pure and applied research in this connection in Gloucester.

We understand that the new process will be of particular value for the machining and finishing of the harder materials and those which are difficult to form by conventional methods. It should make it possible to use materials which, because of machining difficulties, have hitherto been restricted. Sparcatron Ltd. has been formed by the Bath and Portland Stone Firms Ltd., who also control Impregnated Diamond Products Ltd.



*An artist's impression of Trinidad and Tobago Electricity Commission's new head office in Port-of-Spain, designed by Mence and Moore, chartered architects, of London and Trinidad. The site for this new building has been cleared and the actual building is expected to begin this year. The ground floor is to be a showroom and the Commission's administrative offices will be on the first and second floors*



*Our illustration shows part of the interior of Cliff Quay power station where the 87-ton stator of the sixth Metrovick 45,000 kW turbo-generator is being lowered into position*

## *Thorn's Sales Offices Reorganised*

A MAJOR reshuffle of the Atlas Lighting Division has just been announced by Thorn Electrical Industries, Ltd. The addresses, and names of managers consequent upon reorganisation are given below.

Sales Offices — London: 233 Shaftesbury Ave., W.C.2. Temple Bar 1599. Commercial Manager: E. C. Wilson. Sales Manager: L. A. Moir.

Midland: 57 Park Street, Birmingham. Mid. 5122; Manager: E. W. King.

Western Sales Office: 21 Canton Bridge, Cardiff. Cardiff 23962. Manager: E. G. Jones.

N.W. Sales Office: 9 Stevenson Square, Manchester. Cen. 3185. Manager: S. A. Woods.

N.E. Sales Office: 35 Aire Street, Leeds, 1. Leeds 30272. Manager: A. C. Page.

Scottish Office: Barfillan Drive, Paisley Rd. West, Glasgow. Halfway 4688. Asst. Manager: R. Kyffin.

Northumberland, Durham, Cumberland and Westmorland: Distributors: A. S. McHugh & Co., Ltd., 46 Sandhill, Newcastle. Newcastle 24068-9.

N. Ireland: Distributors: Wilmor & Co., 17-19 Queen St., Belfast. Belfast 25746.

Eire: Distributors: Brownlee Bros., Ltd., 32 Molesworth Street, Dublin. Dublin 61201.

## MOBILE SHOWROOM TO TOUR CANADA

PROBABLY one of the most outstanding among British exhibits at the Canadian International Trade Fair taking place in Toronto at present is the mobile exhibition sent to Canada by Woods of Colchester, Ltd. Included among the goods being shown in the van are all types of Aerofoil fans. Also displayed are component parts of impellers and motors.

This mobile showroom has already done valuable work in England, and after the Toronto Fair, which closes this weekend, it will tour all the major cities in Quebec and Ontario provinces. The company's products, distributed on that continent by British General Electric (Canadian) Ltd., are understood to be securing a growing volume of trade in Canada, and the tour should increase exports even more, and win more dollars for Britain.

*The simple display of fans which has been sent to Canada by Woods of Colchester Ltd. for the Trade Fair and to tour Quebec and Ontario*

## THREAT OF STRIKE IF CLAIM IS REJECTED

IF the British Electricity Authority rejects the claim now under consideration for an all-round 3d. an hour increase for manual workers in the electricity supply industry, shop stewards will serve 21 days' notice on behalf of the men, it was stated at Birmingham last Saturday, at a national conference of shop stewards employed in the electricity supply industry. (This claim is still the subject of discussion by the N.J.I.C.) Delegates also agreed that if the 3d. increase is granted to instruct the trade unions' negotiating committee to place claims for a further rise of 3d. an hour. Seven days' notice would be served, it was stated, if any men in the industry were declared redundant before the negotiating committee had been consulted.

## ELECTRICIANS' TALKS GO ON

THE 3,000 or more electricians employed by contracting firms in London who went on strike recently, as we noted last week, returned to work on Monday following the intervention of the Ministry of Labour in getting officials of the National Federated Electrical Association and the Electrical Trades Union to agree that the dispute should go through the normal industrial negotiating machinery. The N.F.E.A. and the E.T.U. also agreed to resume last Tuesday the negotiations on wages and holidays which were broken off but both sides agreed to differ on the issues at stake in the dispute.

## *Development of H.E. Power in Pakistan*

THE need to develop Pakistan's hydro-electric power resources was stressed by the High Commissioner for that country, Mr. M. A. H. Ispahani, at the monthly meeting of the B.E.A. M.A. Export Panel last week. It was estimated that her power potential from these sources was between five and six million kW, he said. Mr. Ispahani went on to say that while an overall power development plan was in the course of preparation, work was in progress for increasing the capacity of existing power stations, and building new ones. When the Rasul project was commissioned this year, output of H-E power was raised from 10,000 kW last year to 42,000 kW. Next year the Deyai project will add another 15,000 kW, and by 1958 it was hoped to harness a further 300,000 kW.

Mentioning further schemes, Mr. Ispahani spoke of new diesel power stations at Chittagong and Decca, the Karnafuli project and new H-E station at Silchari.

At present, Pakistan did not manufacture any electrical equipment except lamps, he continued, and had, therefore, to import all her requirements.

## *Engineering Films for Schools*

FOUR new films have been produced by Babcock and Wilcox, Ltd., which deal with fundamental processes in engineering, and are intended to supplement lectures during basic training of students and apprentices.

"Welding in Boiler Manufacture" instances a variety of welding practices of both fusion and pressure principles, and includes an examination of boiler drum welding, using industrial X-ray equipment. Hand and machine moulding is shown in "Foundry Practice," which covers also basic processes of pattern and core making in hand casting. Examples of both light and heavy forging are shown in this film, concluding with the manufacture of sinuous headers used in B. and W. straight tube boilers. "Seamless Tube Making" outlines the two processes whereby such tubes are made.

## INSPECTION COUNCIL: *Final Report Soon*

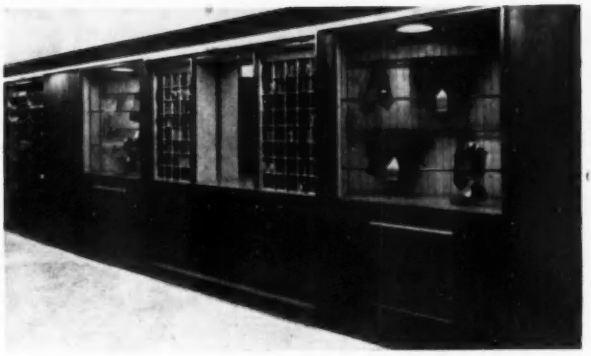
THE annual meeting of the National Register of Electrical Installation Contractors took place on Monday. Concerning the formation of the National Inspection Council it was stated that the report of the organising committee was in draft form but had not yet been published. It is known, however, that the report proposes a new organisation should be set up to replace the National Register. The report is expected shortly and those responsible for the inauguration of the new body are anxious that it be formed as early as possible. Mr. P. V. Hunter, chairman, expressed his appreciation of the way in which the working constitution of the N.R.E.I.C. had been considered.

## STREET LIGHTING ON FESTIVAL ESTATE

DESIGNED as a showpiece of British achievements in estate planning, the Festival of Britain housing estate at Lansbury, Poplar, is truly enhanced by the street lighting scheme incorporated in it. There were, of course, two main requirements, excellent optical performance and the ability of fittings to look attractive and blend with their surroundings when not in use. In this instance, Golden Ray Mark 3 lanterns, made by the Engineering and Lighting Equipment Co. Ltd., were chosen. They are manufactured in two sizes, for use on both group A and B roads, and to date about 100 of these lanterns have been installed on the estate.

In the Market Square four 140 W (group A) lanterns have been mounted on two double-arm concrete columns, both of which are shown in our accompanying illustration. The small pillars, incidentally, are for the use of stallholders, providing them with a supply of electricity. On roads in the estate the 60 W (group B) models have been employed, and erected at intervals of 120 ft.

*Two views of the Lansbury housing estate, showing (left) the market square, and (right) a road on the estate*



*Thermovent heaters in Austin Reed's new premises at Brighton*

## Electric Heaters in Outfitter's Shop

AN attractive installation of electric heaters is to be found in the reconstructed premises of Austin Reed Ltd., at Brighton. Thermovent heaters supplied by E. K. Cole Ltd., were used, and have been inset in the walls. There is no risk that the walls will be blackened because warm air is emitted horizontally. This type of heater is most appropriate for outfitters, providing good general heating without the possibility of scorching stock or customers' clothes in fitting rooms or narrow spaces. In this particular instance, the units (of plastic and steel construction) blend admirably with the surrounding woodwork of cupboards, showcases and counters.

## *Contractors Complain*

EASTBOURNE branch of the Electrical Contractors' Association have complained to the town's Finance Committee concerning unfair trading. They allege that electrical work and maintenance of equipment for the corporation are being carried out by the S.E. Electricity Board, and that local contractors do not have the opportunity of undertaking such work. The committee has asked for reports by the town clerk, borough treasurer and borough surveyor.

## NEWS IN BRIEF

The Gramophone Co. Ltd. ("His Master's Voice") have produced a small one-inch tube television receiver for demonstration purposes, chiefly to emphasise the large pictures given by the 15 in. and 21 in. receivers.

A scholarship scheme is to be instituted by Marconi International Marine Communication Co. Ltd. to help young men wishing to embark on careers at sea as radio officers.

Sunderland housing committee has decided against installing washing machines in council houses. It was contended that the cost of operating the machines would be too high for most council house tenants.

Among those exhibiting at the "Building Today" exhibition being staged at Northampton Technical College are the E. Midlands Electricity Board and Coal Utilisation Council. The exhibition is to run between July 4 and 10.

An impressive new factory is to be added to the existing premises of Venner, Ltd., at New Malden, Surrey. An additional three-quarters of an acre of much needed working space will be provided by this new building which is an excellent example of modern architecture and design.

The inaugural meeting of the Southampton branch of E.A.W. took place recently.

## One Council for All Kinds of Fuel

Mr. I. J. Pitman, speaking on consultative councils in the House of Commons, said they were subservient to the management, powerless, and used chiefly to placate criticism by consumers rather than criticise management. He suggested that the councils should be consumers' advocates against the Boards, that the present loyalty of the chairman and secretary to the Board should cease, and that a central staff office be appointed to serve the councils and consumer representation generally. Mr. J. MacColl said he was inclined to do away with the councils altogether and divide the work between local authorities and a select committee of the House. If they were to be maintained they should be multi-purpose, he said, one council representing the interests of consumers of all types of fuel.

Replying, Mr. Joynson-Hicks said the whole matter was an experiment. Concerning the position of the chairman, who was *ex officio* a member of the Board, he said the arrangement might well be revised.

## Rural Schemes Progress As Fast As Practicable

In his reply to a debate on rural electrification, Mr. Joynson-Hicks said it was of urgent moment to proceed as fast as practicable with rural development, but that emphasis was on the word "practicable." Giving some facts on progress being made, he said £4.4 million was spent on rural electrification in 1949, £4.8 million in 1950, and £4·9 million in 1951. Planned expenditure this year was £5 million and in 1953 it was £6 million. Before nationalisation, 81,500 farms were connected and up to the end of last year that figure had risen to 117,000.

The main complaint of Mr. C. J. M. Alport in the preceding speeches was that even with the additional money available, agriculture's problem was unlikely to be met.

# Electric Supply News . . .

**Durham**

The Ministry of Fuel and Power has approved the scheme prepared by the B.E.A. for the construction of a 275 kV overhead line from Carlisle to Stella near Newcastle-on-Tyne, a distance of about 60 miles. When an inquiry was held into the scheme some months ago, there was considerable opposition, especially from farmers and others interested in rural areas, on the grounds that the proposed line would interfere with good farming land. The opponents put forward an alternative route which, however, was not acceptable to the B.E.A. It is understood that there will be 250 pylons spaced at intervals of about 350 yards. Although the Ministry has approved the scheme, opposition is being continued, and Mr. R. Speir, M.P. for Hexham, has been asked to seek an interview with the chairman of the B.E.A. in another effort to have the proposed route amended.

**Eastbourne**

The town council has decided to buy back two plots of land from the B.E.A. at a cost of £1,385, which the Corporation originally purchased for extensions to its own electricity undertaking. Under the 1947 Act, of course, the land was taken over by the B.E.A., but the Authority no longer wants the land.

**Eire**

Details of the average cost per unit generated at the various plants of the Electricity Supply Board during 1950-51 were given in a reply to a question in the Dail recently. Ardnacrusha, the first station established by the E.S.B., still holds pride of place with a figure of 0·22d.; then comes the recently-opened Cliff station on the river Erne with 0·38d., followed by the three on the Liffey (Poulaphouca, Golden Falls and Leixlip) with 0·65d. The oil-fired plant at North Wall, Dublin, produced current at a cost of 0·89d., the coal-burning Pigeon House, Dublin, at 0·96d. and the turf-using station at Portarlington at 1·09d. These figures include the expenses of supervision at the stations, but not any allocation of the general administrative expenditure of the Board.

**Eston (Yorks)**

The Urban Council has approved plans by the North Eastern Electricity Board for the laying of 11 kV underground mains for supplying electricity to Dorman Long and Co., Ltd., the Redcar Road housing estate, South Bank, and for the reinforcement of the network in the Eston-Normanby area.

**Glasgow**

The Corporation Municipal Transport Committee has approved a proposal for the installation of a new coal-handling plant at the Pinkston power station, and ancillary works required in connection therewith, including the renewal of the existing railway sidings, at an estimated cost of £59,810.

**Northallerton**

Electricity supplies will be given to Nether Silton and Over Silton this year, and a start is to be made at Thimbleby, Councillor C. N. Kirby told the Northallerton Rural Council last week.

**Penrith**

The North Western Electricity Board is to improve the electricity supply in the Penrith area by tapping the 132 kV grid system near Maiden Hill. Hitherto the area has been supplied by two 33 kV lines from Carlisle. The improved supply is intended to cope with developments expected to be carried out in the Penrith area during the next few years.

**Skipton**

The U.D.C. has told the Yorkshire Electricity Board that it will not allow trees to be felled on the Aireville estate to enable the Board to take o.h. lines to Aireville Hall, which is being made into an annexe for Skipton Secondary Modern School. Between nine and twelve trees would be involved.

**Storrs Loch**

We understand from the Hadland Engineering Co. that they designed and manufactured the two 800 kW alternators installed at the North of Scotland Hydro Electric Board's Storrs Loch power station, recently opened, and not Bruce Peebles as was stated in an earlier Report of the Board.

**Uckfield**

The South Eastern Electricity Board propose to erect a 33 kV overhead line from Ringmer to Uckfield, where a substation is to be constructed. Mr. H. Pryce-Jones, manager of the Board's mid-Sussex sub-area, has communicated with the Uckfield Parish Council concerning a site for the latter.

## LIGHTING SCHEMES

**Bath.**—T.C. is recommended to extend the new experimental lighting through Pierrepont Street and Manvers Street, North Parade and Grand Parade.

**Bournemouth.**—The Borough Engineer has been instructed to investigate the possibility of converting existing gas lamps to electricity.

**Doncaster.**—It is proposed to install lighting on a section of the Great North Road between the North Bridge, Doncaster, and the end of Green Lane, Scawthorpe. The local authorities concerned are Bentley U.D.C. and Doncaster R.D.C.

# Company Activities . . .

**Allen West & Co.**

For the year ended January 31 last, the group trading profit is £928,875 (*£694,503*), plus other income of £23,105 (*£12,332*). After charging taxation of £510,019 (*£315,446*), depreciation £80,711 (*£81,612*), etc., the balance remaining is £296,870 (*£254,664*), of which £266,105 (*£243,726*) is dealt with in the accounts of Allen West. To group general reserves £170,000 (*same*), and after dividend, there is £189,992 (*£139,903*) carried forward.

**Anglo-Portuguese Telephone Co.**

Under a new capital issue, announced at the meeting last Thursday, holders of the Ordinary and "A" Ordinary stock will be offered 850,000 £1 Ordinary shares on the basis of one share at 20s. 6d. for each £2 of stock held. The chairman, Sir Alexander Rogers, said the proceeds would fund the temporary loans from the Telephone and General Trust of £400,000 and provide additional capital to meet the cost of further supplies of plant to Portugal necessary to maintain progress.

**C.V.A. Jigs, Moulds & Tools Ltd.**

Trading profit for 1951 of this concern which makes electric domestic appliances among other things, is £187,378 (*£109,664*), which is increased by other income to £228,071 (*£165,996*). After all charges, including taxation of £71,037 (*£49,331*), the net profit is £49,774 (*£38,432*). The dividend is again 6%, £27,716 (*£23,179*) is carried forward.

**Lisbon Electric Tramways**

Net profit for 1951, after all charges, including taxation, is £63,520 (*£70,390*). The final Ordinary dividend is 2½% tax free, making 5% tax free (*same*).

**Ship Carbon Co. of Great Britain**

A decrease in the net profit from £96,506 for 1950 to £89,332 for last year is reported. These figures are struck after deducting taxation of £134,822 (*£111,335*). The dividend is 21% on capital increased by 20% bonus.

**John Thompson Ltd.**

This firm of combustion and general engineers is offering to stockholders 687,959 5s. Ordinary shares at 14s. 6d. each, on a one-for-four basis. The new shares will rank for the final dividend in respect of 1951, payable on July 23.

**G. & J. Weir**

Increased output of the group and higher costs cannot be secured without additional finance, the chairman, Viscount Weir, states. The main demand for additional finance is from the Housing Corporation, and it is proposed to increase bank borrowings. The parent company proposes to strengthen its interest in the Weir Housing Corporation by subscribing for 150,000 new £1 Ordinary shares, also to subscribe for 100,000 new £1 Ordinary shares of Weir Values. The 200% Ordinary share bonus proposed, as previously announced, will mean capitalisation of £1,345,538 of reserves.

**Worthington-Simpson Ltd.**

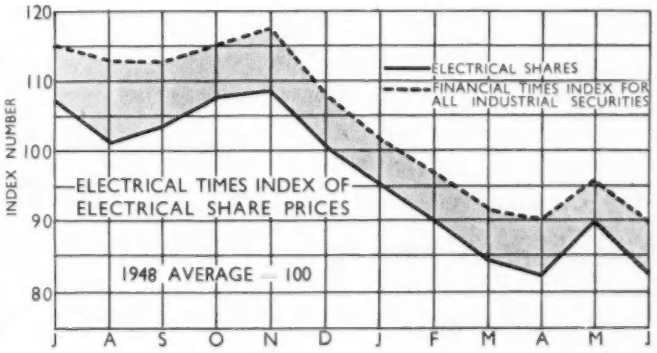
Trading profit, etc., for 1951 increased to £593,980, as against £556,183 for the previous year. There is an Ordinary dividend of 20% plus one for ten scrip bonus. After all deductions, including £311,000 (*£294,375*) for taxation, the net profit is £217,363 (*£201,375*), to which £148,928 (*£117,459*) brought in is added, making £366,291 (*£318,834*) available. To retirement benefits £10,000 (*£15,000*), general reserve £150,000 (*£100,047*), and after payment of dividends there is £152,780 carried forward.

**Dividends Declared**

*J. Stone* (*Holdings*).—Final dividend of 7½%, making 12½% (*both same*), plus 3% (2½%), from capital profits.

*Plessey Co.*—Interim Ordinary dividend of 12½% (*10%*).

*The rise in share price indices at the end of April was short-lived, and at the end of last month levels of both returned to the previous month's figures. The "Financial Times" index for all industrial shares dropped from* **96.3** *to* **89.9** *during May, while the "Electrical Times" index for electrical shares in particular fell by* **7.8** *to* **82.2.** *These figures are based on the average prices ruling during* **1948**



# Commercial Information

## CONTRACTS OPEN

### HOME

**June 13.—Limerick.** Supply of protected type electric power units to drive various items of quarry plant, and suitable for 3-phase, 380 V, standard frequencies, 50 c/s. County Council Secretary, 82 O'Connell Street,

**June 14.—Aberdare (Glam) U.D.C.** Street lighting improvement schemes in Cardiff Rd., Hirwaun Rd., and Victoria Sq. Engineer and Surveyor, Vestry Hall.

**June 14.—Chadderton U.D.C.** Materials and works in new street lighting scheme comprise (*a*) supply of 49 lanterns, transformers, capacitors, time switches, fuses for 140 W sodium lamps; (*b*) supply of 49 concrete columns 25 ft. high; and (*c*) erection of those columns. Engineer and Surveyor, Town Hall. (See May 29 issue.)

**June 14.—Cork (Eire).** Electrical installation in buildings at hospital at Loto, Granmire. Nicholas Mathews, Consulting Engineer, 42 Fitzwilliam Pl., Dublin. Deposit £10 10s.

**June 14.—Lanark.** Electrical work in erection of 126 houses at Cambuslang, 90 at Bellshill, 72 at Baillieston, 70 at Kirkfieldbank, 34 each at Carmunnock and Salsburgh, and 22 at Busby. Applications by above date to S. McColl, County Housing Architect and Engineer, 23 Beckford St., Hamilton.

**June 14. — Royton (Lancs.) U.D.C.** Provision of street lighting comprising erection of lamp columns and jointing, servicing and connection of those columns in Shaw Rd. and Broadway. Engineer and Surveyor, Town Hall.

**June 16.—Armagh.** Electrical installation in extension of St. Patrick's College for Principal and Governors. F. D. Brown and Sons, consulting engineers, 93 Ann St., Belfast. Deposit £5.

**June 16.—Ayr.** Supply of electric lamps required by County Council. County Clerk, Supplies Dept., County Buildings.

**June 16.—Bristol.** Supply of electrical stores for year ending June 30, 1953, for Cossham and Frenchay Hospital Management Committee. Secretary, Frenchay Hospital, Bristol.

**June 16.—Ceiriog (Denbigh) R.D.C.** Electrical installation in 40 houses and six shops with flats on Rhosywaen site, Chirk. R. W. Aubrey, Surveyor, The Mount, Chirk. Deposit £1 1s.

**June 16.—Dublin.** Supply of following lighting requirements: sodium, incandescent, etc., fittings; brackets, bends and back plates; illuminated guard posts. Finance Dept., City Hall.

**June 16.—Fife.** Electrical work in public health clinic at Cowdenbeath. Surveyors are Robt. Calbreith and Lawson, 21 Crossgate, Cupar.

**June 16.—Oldbury T.C.** Provision and erection of 26 concrete street lighting columns with time switches, h.p.m.v. discharge lamps in Class A, and for fixing only of lanterns and auxiliary equipment. Borough Surveyor, Municipal Bank Chambers. Deposit £2 2s.

**June 16.—Romford T.C.** Street lighting included in various works in Ferndale and Mowbray Roads. Borough Engineer and Surveyor, Town Hall. Deposit £2 2s.

**June 17.—Worthing (Sussex) R.D.C.** Installation of electricity in 40 houses at Sompting (Contract A); 49 at Angmering (Contract B); and 46 at East Preston and 16 at Rustington (Contract V). Housing Manager, 15 Mill Rd. Deposit £1 1s.

**June 18.—Burton-on-Trent T.C.** Replacement of 43 lamps and conversion from gas to electricity in various streets. Borough Surveyor, Town Hall. (See May 22 issue.)

**June 18.—High Wycombe T.C.** Supply and erection of (*a*) steel columns (from stock) and installation of auxiliary equipment, lanterns and wiring, etc.; and (*b*) supply of lanterns, 400 W mercury lamps and sets of auxiliary apparatus for street lighting along trunk roads A.40 and A.4010. J. A. Parkinson, Borough Engineer and Surveyor, Municipal Offices, Queen Victoria Rd. Deposit £2 2s. (See May 22 issue.)

**June 18.—Manchester.** Supply of synchronous motor-driven electric time-switches for street lighting during period ending Dec. 31, 1952. City Surveyor (Room 329), Town Hall.

**June 19.—N. Ireland.** Internal wiring and high and low distribution systems at Londonderry and Gransha hospital. Names by above date to Secretary, N.I. Hospitals Authority, 58 Howard St., Belfast.

**June 20.—Belfast.** Supply of electrically wound solar dial time switches. Electricity Dept., East Bridge St. (See May 29 issue.)

**June 20.—Edinburgh.** Electrical installation work on Mindhouse housing estate. City Architect, City Chambers.

**June 20.—Londonderry.** Complete electrical installation at Garvagh House. J. R. W. Murland, Consulting Engineer, 13 Wellington St., Belfast. Deposit £3 3s.

**June 20.—Rochdale T.C.** Lighting and power installation at Baillie St. school. Tenders to Town Clerk, Town Hall.

**June 20.—Wellington (Salop) U.D.C.** Supply and erection of 55 street lighting units in class A for London-Holyhead Rd. Engineer and Surveyor, A. G. Barton, Council Offices, 14 Walker St. (Advertised in this issue.)

**June 21.—Stoke-on-Trent T.C.** Tenders invited for (a) installation of mercury street lighting comprising supply, erection and wiring of 145 concrete columns with lanterns and accessories in class A; and (b) supply, excavation, laying and jointing complete of street lighting, mains and services, provision of time switches and cut-outs; for Winchester-Preston trunk road. City Engineer and Surveyor, Town Hall. Deposit £3 in each case.

**June 23.—Dumfries T.C.** Electrical installation in 32 houses at Jock's Loaning. Names to J. Hutcheon, Town Clerk, Municipal Chambers, Buccleugh Street.

**June 23.—Finchley T.C.** Supply of (*a*) 152 lanterns for 140 W sodium vapour lamps, with lamps, control gear and fuses; and (*b*) 152 concrete columns and fixing of lanterns, etc. P. M. Spender, Borough Engineer and Surveyor, 294-6 Regents Park Rd., N.3. Deposit £2 for each section.

**June 23.—Lisburn.** Electrical installation at Killowen Convalescent Hospital. Consulting Engineers, F. W. Parkinson and Partners, 6 Murray St., Belfast. Deposit £3 3s.

**June 23.—Manchester.** Supply of electric machines and machine tools for Newall Green Secondary School City Architect, Town Hall. Deposit £1 1s.

**June 23.—N. Ireland.** Electrical installation in 89 dwellings at Newry, 72 at Banbridge and 39 at Kilkeel for N.I. Housing Trust. Trust offices are at 12 Hope St., Belfast. Deposit 10s. for each scheme.

**June 23.—Wanstead and Woodford B.C.** Installation of 160 W blended lighting in Group B on 23 routes. Included: (*a*) provision of lanterns, control gear and fittings for extension and conversion to electric lighting of about 270 existing gas columns and same for about 100 gas columns; and (*b*) provision and erection of about 70 concrete columns with lanterns and control gear. Borough Engineer and Surveyor, Municipal Offices, High Rd., Woodford, E.18. Deposit £2. (See May 22 issue.)

**June 23.—Wolverhampton T.C.** Supply and erection of sodium and mercury lighting including columns, lanterns, control gear and time switches for street lighting on class A and B roads. Borough Engineer, Town Hall. Deposit £2 2s. (See June 5 issue.)

**June 24.—Birmingham.** Electrical installations at Quinton Rd. West Police Station. H. J. Manzoni, City Engineer and Surveyor, Civic Centre, Birmingham 1. Deposit £2 2s.

**June 24.—Grimsby T.C.** Electrical installation in erection of Western primary infants school at Littlecoates. J. V. Oldfield, Borough Engineer and Surveyor, Municipal Offices, Town Hall Square. Deposit £5.

**June 27.—Norton R.D.C.** Electrical work in houses at Burythorpe and Kennythorpe, near Malton. R. W. Clayton, Architect to Council, Welham Road.

**June 28.—Caerphilly U.D.C.** Supply, erection and servicing of public lighting installations at Penytheol, comprising (*a*) 33 Group A standards with 140 W sodium lamps and lanterns, and (*b*) 117 Class "B" columns with 100 W filament lamps and lanterns. Names to Engineer and Surveyor, Council Offices, by June 14.

**June 30.—Stockport T.C.** Rewiring, lighting and electrical installation at Town Hall. Wm. F. Gardner, Borough Surveyor, Town Hall. Deposit £5 5s. (See May 29 issue.)

**July 3.—Birmingham.** Installation of electric lifts in 7-storey flats at Shard End. City Engineer and Surveyor, Civic Centre. Deposit £2 2s.

**July 7.—Ashbourne U.D.C.** Supply and erection of 28 140 W sodium lamps, and 70 150 W tungsten all complete with standards for street lighting. Engineer and Surveyor, King Edward St. Deposit £1 1s. (See June 5 issue.)

**July 7.—Dublin.** Electrical installation at Dublin Regional Sanatorium, Blanchardstown. P. D. Cinneide, Dept. of Health, Custom House. Deposit £20.

**July 7.—Leeds.** Supply, erection and maintenance of an electrically driven centrifugal pump with capacity of 1,400 galls. p.m. General Manager and Engineer, Waterworks Dept., Civic Hall.

**July 16.—Gloucester.** Supply and installation of two electrically driven well pumps at Newent station. Pumps to be driven by shafts from vertical motors on surface. J. H. Goodridge, City Surveyor and Water Engineer, 21 Eastgate St. Deposit £2 2s. (See May 29 issue.)

## OVERSEAS

*Details of items marked * may be obtained on application to the Board of Trade, Horseguards Avenue, S.W.1, quoting reference.*

**June 26.—South Africa.** Two tenders invited by S. African Railways, Stores Dept. The first is for some 14,124 yd. of telephone cables and accessories. The second is for about 755,000 yd. of electric signalling cables. Tender Board, P.O. Box 7784, Johannesburg. B.o.T. (Refs.: CRE 19370/52 and CRE 19623/52 resp.).*

**July 1.—New Zealand.** Supply of large quantities of telephone cable to various specifications required by Director-General (Stores Div.), G.P.O., Wellington. B.o.T. (Ref. CRE 19988/52).*

**July 7.—India.** Supply of two single operator diesel engine driven portable arc welding sets —300 A. Tender forms (Rs. 5) from Director General, Supplies and Disposals, Shahjahan Rd., New Delhi.

**July 8.—India.** Supply of 3,000 33 kV pin insulators and 240 33 kV disc insulators for Director General, Supplies and Disposals, Shahjahan Rd., New Delhi. B.o.T. (Ref. CRE 19314/52).*

**Aug. 27.—Australia.** State Electricity Commission of Queens-

## *Your Queries — Answered*

**"Interohm" insulation,** makers of? J.B.—Interohm Electrical Insulators Ltd., Freemantle Rd., Lowestoft. (23184)

**"Electronaire" vacuum cleaners, etc.,** address for repairs? T.B.—Vacuum Cleaner Repair Co., 63 Old Church Rd., E.4. (23189)

**"Selah" heaters,** makers of? C.E.—C. Hale and Sons Ltd., 51 Broadgreen Rd., Liverpool 13. (23197)

**"Lexel" drink mixers,** makers of? T.E.—H. W. Carter and Co. Ltd., 3 Duke St. House, Oxford St., W.1. (23206)

**"Allton" towel rails,** makers of? W.E.—Allton Products Co., 3 Queslett Rd., Great Barr, Birmingham 22A. (23217)

**"Noltalux" lighting fitting,** agent for? W.E.—Elkay Electrical Mfg. Co. Ltd., 42 Woburn Place, W.C.1. (23226)

**"Peak" refrigerators,** suppliers of? S.C.—R. H. Ingham and Co. (London) Ltd., High Cross Rd., London, N.17. (23234)

**"Magnicon" alternators,** suppliers of? B.L.—Crompton Parkinson Ltd., Crompton House, Aldwych, W.C.2. (23246)

*The above are selected from questions we have answered this week. If you have a query, send it to us.*

land, Scottish Union House, Eagle St., Brisbane, invites tenders for manufacture, supply and maintenance of two transformers each for Wide Bay-Burnett, and Capricornia electricity boards, and four for Townsville board. B.o.T. (Ref. CRE 19173/52).*

**No date stated.—Uruguay.** Administracion Municipal de Transportes invites tenders for supply of 57,200 electric light bulbs between 15 W and 300 W. B.o.T. (Ref.: CRE 19861/52).*

## CONTRACTS PLACED

**B.E.A.** Further bulk orders for transformers for main transmission have been placed. They have aggregate value of £5,250,000, and have been distributed as follows: English Electric Co., Ltd., 14, including two 120 MVA 275/132 kV; Ferranti, Ltd., 22, including six 120 MVA 275/132 kV; British Thomson-Houston Co., Ltd., two 120 MVA 275/132 kV; Bruce Peebles and Co., Ltd., seven, including two 120 MVA 275/132 kV; General Electric Co., Ltd., seven, including two 120 MVA 275/132 kV; The Hackbridge and Hewittic Electric Co., Ltd., six, including two 120 MVA 275/132 kV; Metropolitan-Vickers Electrical Co., Ltd., four 120 MVA 275/132 kV; C. A. Parsons and Co., Ltd. three 120 MVA 275/132 kV; Johnson and Phillips, Ltd., six 30 MVA 132/33 kV and earthing transformers; British Electric Transformer Co., Ltd., 11; and Fuller Electrical and Manufacturing Co., Ltd., 12.

**Cheltenham T.C.** Electrical installation in 186 dwellings on Arle and Hesters Way estate. J. Hearson and Co. Ltd., £6,539.

**Maidstone T.C.** Electrical wiring of 108 houses on Shepway estate. H. T. Barden, £3,009.

**Romford T.C.** Electrical installation in 68 houses and bungalows on Fullers Farm estate, and 32 houses on Hillfoot Rd. estate, Amef Electrical Co., Ltd., £2,612. Also conversion of street lighting from gas to electricity, Eastern Electricity Board, £18,026.

**Sheffield.** Electrical installation in 20 dwellings on Basegreen estate and 42 on Birley estate, M. B. Munks, £1,107.

**Skelton and Brotton (Yorks) U.D.C. Wiring of 22 houses on Windhill Boosbeck estate, Watson and Coates, Ltd.**

**PRICES OF CABLE METALS AND OTHER MATERIALS**
*(at Wednesday morning)*

| | £ s. d. | New York price |
|---|---|---|
| COPPER, electrolytic ... ... ... | 231 0 0 | £284 0 0 |
| LEAD, good soft pig (foreign) ... ... | 129 0 0 | 120 0 0 |
| ,, ,, ,, "English" quality ... | 130 10 0 | |
| Tin (99.99....75) ... ...(Cash) | 970-971 | — |
| ,, (3 months) ... ... ... ... | 964-964½ | — |
| ALUMINIUM, commercial purity (del.) | 154 0 0 | — |
| ZINC ... ... ... ... ... | 138 0 0 | 128 0 0 |
| ARMOURING: | | |
| Galv. Steel Wire (0.104 in.) ... | 55 10 0 | — |
| Mild Steel Tape (0.04 in.) ... ... | 39 15 0 | — |

# GAZETTE ANNOUNCEMENTS

## COMPANIES ACTS

**Electrical and Car Services (Luton), Ltd.** Liquidator, Alfred G. R. Hayman, 66 Alma St., Luton, released as from May 28.

**Farby's,** distributors of electrical goods and accessories, of 98 London Rd., St. Albans, Herts. Partnership between Frederick R. Brice and Stanley J. Phillips dissolved as from May 20.

**John Ferguson Associates, Ltd.,** dealers in electrical plant and equipment of 218 Bishopsgate, E.C. Last day for receiving proofs in respect of intended payments to preferential creditors, June 14. Liquidator is J. M. Clarke, Official Receiver, Inveresk House, Strand, W.C.2.

**Henray Electrical Co., Ltd.** Meetings of creditors and contributories are taking place today (Thurs.) at Inveresk House (Room 401), Strand, W.C.2, at 2.30 p.m. and 3 p.m. resp.

**Midland Wireless and Electrical Appliance Co., Ltd.** Creditors are asked to send particulars to liquidator, H. L. Barlow, 66 Alma Rd., Luton, by June 30.

**Refrigeration and General Utilities, Ltd.** Resolution for voluntary winding-up passed at meeting on May 26. John Bernstone Marks, 23 Essex St., W.C.2, has been appointed liquidator, to whom creditors are asked to send particulars by June 30.

## BANKRUPTCY ACTS

*First Meetings*

**Guildford.** Ronald H. Winslade, electrical engineer, of 21 Park Rd., Aldershot. First meeting at 3 Central Buildings, Matthew Parker St., Westminster, on June 17 at 11 a.m., and public examination at the Guildhall, Guildford, on Sept. 2 at 11 a.m.

**Kendal.** George H. Measures, electrical goods dealer of 10 Brokey Howe Terrace, Windermere. First meeting at County Court Offices, 48 Stramongate, Kendal, on June 16 at 3 p.m., and public examination at same place on July 21 at 11.30 a.m.

*Voluntary Liquidation*

**Alfred Appleby and Co. (Electrical), Ltd.,** Kingston-on-Thames. At statutory meeting of creditors Chairman reported that liabilities amounted to approximately £5,501, of which £5,137 was due to trade, etc., creditors and £363 in respect of income tax (P.A.Y.E.). Assets estimated at £5,683 and after deducting £1,351 for preferential claims, there were net assets of £4,331, or a deficiency of £1,170. Resolution was passed confirming voluntary liquidation with Mr. David Morgan, accountant of 100 Park Street, Grosvenor Square, London, W.1, as liquidator. Committee of inspection was also elected.

*Release of Trustee*

**Bury St. Edmunds.** Louis W. Aldis, electrical engineering contractor trading at Lyndhurst Cottage, Woolpit. Trustee was K. E. Fisk, Official Receiver, 13A Gt. Colman St., Ipswich.

## TRADE MARKS

*This information is extracted from the Official Journal by permission of the Controller.*

**Berry's.** 694,607. Class 9. Electrical switchgear, and 694,608. Class 11. Pendants, wall brackets, lamp standards, and lamp shades, and electric fires, radiators etc. Berry's Electric Ltd., 85/86 Newman St., W.1.

**Deltcos.** 704,133. Class 9. Electrical apparatus and instruments. Delta Technical and Commercial Services Ltd., Elektron Works, Sydenham Rd., S.E.26.

**Metfridge.** 704,578. Class 11. Refrigerators and refrigerating installations. Metropolitan Refrigeration Ltd., 73 Charterhouse St., E.C.1.

# BUSINESS PROSPECTS

## HOME

**Alloa T.C.** All trades for erection of 50 houses. W. H. Gillespie, burgh architect, Greenfield.

**Andover.** C.C. recommended to approve installation of electric lighting at grammar school. Estimated cost, £1,875.

**Ashburton (Devon) U.D.C.** Tenders to be invited soon for erection of 54 houses at Headborough.

**Bacup T.C.** Application to be made for sanction to borrow total of £51,590 for erection of 48 dwellings on three sites.

**Barnard Castle R.D.C.** Construction of 40 houses at Staindrop. Council's Architect is J. Lawton, 45 Galgate.

**Barnsley T.C.** Erection of 106 houses on Yew's Farm estate. Borough Engineer, Town Hall.

**Battersea.** Scheme approved for development of fourth part of Patmore estate by erection of 155 flats and 54 maisonettes.

**Belfast.** Approval received for development of N. Ireland Tuberculosis Authority's headquarters in Adelaide St., at estimated cost of £20,000.

**Billingham-on-Tees.** The I.C.I. Ltd. are to erect administration buildings. It is also proposed to build 192 houses and 8 shops on Roseberry Rd. estate.

**Canterbury.** Construction of further 82 houses on London Rd. site. L. Hugh Wilson, City Architect, Municipal Buildings, Dane John.

**Chesterfield.** Approval received for £225,000 scheme for 6-storey block of extensions to Technical College. County Architect, Derby.

**Cuckfield R.D.C.** Erection of 44 dwellings at Hurstpierpoint. A. Hutchings, Engineer and Surveyor, Rural Council Offices, Boltro Rd., Haywards Heath.

**Darlington T.C.** Whessoe, Ltd., are to construct premises on land adjoining the Alliance works.

**Easingwold R.D.C.** Erection of 52 houses on four sites. Housing Surveyor, Croft House.

**Elgin T.C.** Plans approved for erection in three stages of a new town hall. Cost is estimated at £103,000.

**Felixstowe U.D.C.** Erection of total of 74 houses on site No. 11 (Mill Lane). R. W. Harvey, Clerk of Council, Town Hall.

**Folkestone T.C.** Erection of 44 houses on Creteway Down site. Borough Engineer, Municipal Offices, West Terrace.

**Haslingden T.C.** Erection of six blocks (34) of houses and one (4) of flats on Broadway estate. James Mason, Borough Engineer and Surveyor, Municipal Offices.

**Hatfield.** A £163,030 secondary school to be built in Wellfield Road.

**Herne Bay U.D.C.** Erection of 14, 12 and two lots of 10 houses under four contracts at Greenhill. A. S. Wilson and Partners, 8 Princes St., Storey's Gate, Westminster.

**Hendon.** It is proposed to build a junior and infants' school in Courtland Ave., at estimated cost of £48,030.

**Highworth (Wilts) R.D.C.** Plans prepared for erection of 248 dwellings.

**Kensington.** Scheme prepared for development of Tor Gardens site by erection of 56 dwellings costing some £131,800.

**Kingsbridge (Devon) R.D.C.** It is proposed to build a total of 64 houses on eight sites.

**Lleyn (Caernarvon) R.D.C.** Approval given to erection of wind generator with 3,000-yd. overhead line at Mynydd Anelog, Aberdaron.

**Maidstone.** C.C. is recommended to approve provision of improved lighting in Block A of County Hall. Estimated cost £1,540.

**Middleton (Lancs) T.C.** Erection of 94 houses on Hollin estate. J. Pollard, Borough Architect, Town Hall.

**Nantwich (Ches).** U.D.C. to build 56 flats on Marsh Lane site.

**North Riding.** Three old people's homes proposed at Grangetown, South Bank and Normanby. County Architect is H. J. Knowles, County Hall, Northallerton.

**Peterborough.** Further 46 houses to be built on Dogsthorpe estate. Also six shops and four houses on Mountsteven Ave. estate. City Architect, Town Hall.

**Plympton St. Mary (Devon) R.D.C.** Construction of 82 dwellings and shops on Plympton St. Maurice estate. P. T. Loosemore, clerk, Council Offices, Plympton.

**Portland (Dorset) U.D.C.** Approval received for second stage of housing scheme at Verne Common. Estimated cost £200,000.

**Spennymoor (Dur.) U.D.C.** Plans approved for 550 houses on Middlestone Moor estate. Sanction also received to borrow £67,270 for 50 houses to be built at Kirk Merrington.

**Stafford R.D.C.** Erection of 30 houses at Woodseaves. R. Burdge, clerk, Council Offices, 7 St. Mary's Grove.

**Tadcaster.** West Riding C.C. recommended to approve transfer of electrical installation from d.c. to a.c. at The Beeches. The scheme is estimated to cost £4,293.

**Worsley U.D.C.** Construction of between 300 and 360 houses at Little Hulton. H. Lomax, Clerk of Council, Town Hall, Walkden, Manchester.

## OVERSEAS

**India.** Fredysons and Co., Saifee House, opposite Cumballa Hill Post Office, Bombay 26, wish to contact U.K. manufacturers of electric passenger lifts.

**Pakistan.** Prices, etc., being sought for foundry (including overhead electric travelling crane and power riddle) and smithy (including pneumatic hammer and electric welder) equipment, by Lt.-Col. M. A. Hasan of Posts and Telegraphs Dept., Kotri, nr. Hyderabad.

# TRADE NOTES

**Annual Holiday.** The East Pilton, Edinburgh, works of Bruce Peebles and Co., Ltd., will close on Friday evening, July 4, and re-open on Monday, July 21.

**Zinc Price.** As from June 6, the price of good ordinary brand zinc was reduced from £150 to £138 per ton, delivered.

**E.W.F.** H. E. Kettle, Ltd., Knightrider Street, Maidstone, has been elected a member of the Electrical Wholesalers Federation.

**Colombian Tariff.** Modifications to the Colombian Customs Tariff, involving new rates of duty for a number of electrical goods, are now noted in detail in the *Board of Trade Journal* for May 31.

*TRADE NOTES Contd.*

**New Company.** A factory at Germiston, Glasgow, has been secured by Marinite, Ltd., a new concern formed jointly by the Cape Asbestos Co., Ltd., and the Johns-Manville Corpn. to make asbestos materials.

**S.A. Imports.** The South African Minister for Economic Affairs has announced that arrangements have been made for securing additional import permits for certain goods, including 6 V battery radio sets (excluding portables and car radios).

## MEETINGS TO NOTE

**THURSDAY, JUNE 12**

INCORP. PLANT ENGRS. (Newcastle-on-Tyne).—"Feedwater Treatment." Roadway House, Oxford St., 7.30 p.m.

**MONDAY, JUNE 16**

BRITISH ELECTRICAL POWER CONVENTION.—Opens today at Bournemouth, continuing until June 18

INCORP. PLANT ENGRS. (Liverpool and N. Wales).—"Carbon in Engineering." C. D. Adshead. Radiant House, Bold St., Liverpool, 7.15 p.m.

**SATURDAY, JUNE 21**

COMMERCIAL TRAVELLERS' BENEVOLENT ASSOC.—Half-yearly Court of Governors at Benners Hotel, London, 12 noon.

# NEW COMPANIES

*Extracted from the Register issued by Jordan and Sons, Ltd., 116 Chancery Lane, London W.C.2*

**Cannon Industries, Ltd.** To acquire such part of undertaking of Cannon Iron Foundries, Ltd., as relates to manufacture of products, and to carry on business of ironfounders, manufacturers of and dealers in apparatus for generating, distributing or measuring heat, light and sound, sanitary goods and ware, etc. Cap.: £100. Dirs.: not named. Subs.: G. Conrad and F. Thompson, 11 Old Jewry, E.C.2.

**Clapham Auto - Electronics, Ltd.**, 143 Clapham Park Rd., S.W.4. Cap.: £3,000. Permt. dirs.: R. C. Erhardt, I. R. Erhardt and H. H. Crawford.

**Tidbury Brothers Ltd.**, 10-12 High St. Pangbourne, Berks. Electricians, mechanical engineers and manufacturers of and dealers in electrical apparatus and goods. Cap.: £100. Dirs.: not named. Subs.: Edith A. Tidbury, C. H. Tidbury and C. A. F. Kettle.

**Transformer Equipment Ltd.** Manufacturers of and dealers in all kinds of electrical equipment, including transformers, radio gramophones, etc. Cap.: £5,000. Dirs.: J. B. Andrews and Gladys B. Andrews, 161 Uxbridge Rd., Hampton Hill, Mdx; L. H. H. Cooper and Pauline A. L. Cooper, 165 Repton Rd., Orpington, Kent.

**Pete Elstub Ltd.**, 3 Mitchell St., off Bradford Rd., Keighley. Electrical, wireless, radio and television engineers and contractors, etc. Cap.: £2,000. A. B. Mitchell signs as director.

**Fraser Electro-Relays, Ltd.** Time and motion recording machinery manufacturers and dealers, etc. Cap.: £3,000. Permt. dirs.: D. D. A. Fraser McKinnon, G. F. Hinde and F. P. Hoose.

**Teleservice (London), Ltd.**, 608 Romford Rd., E.12. Radio and television serving and maintenance engineers, and manufacturers of electronic apparatus, etc. Cap.: £1,000. Dirs.: D. E. Hosking, H. W. King and A. W. Welsh.

# AUTOMATIC TELEPHONE AND ELECTRIC CO.

## *Vast Expansion in Exports*

THE annual general meeting of the Automatic Telephone and Electric Co. Ltd. will be held on June 24 in London.

The following is an extract from the statement circulated by the chairman, Sir Alexander Roger, K.C.I.E.:—

The profit of the Parent Company before charging taxation amounts to £1,171,981 as compared with the 1950 figure of £1,269,436. After £686,539 is provided for taxation (58·6%) the net profit is £485,442. Dividends at the same rates as last year are proposed.

The Consolidated Balance Sheet clearly discloses the overall strength of the Group.

During the past year the value of sales was a record in the company's history. In common with manufacturers in this country we have, during the years since the war, vastly expanded our exports of telephone equipment. I have great doubts, however, whether this concentration on the export market regardless of the requirements of the home market, has not been carried too far in the case of telephone equipment and very likely in the case of other industries. Quite apart from the needs of the public whose demands for telephone service will not be met for increasingly longer periods, the industry can best rest on the solid foundation of a growing demand in the home market.

Our sales in the field of Radio and Carrier Telephony and Telegraphy have shown rapid progress and this sphere of our activities should continue to expand. On the export side the results have been particularly encouraging. Orders have been received from 61 overseas territories.

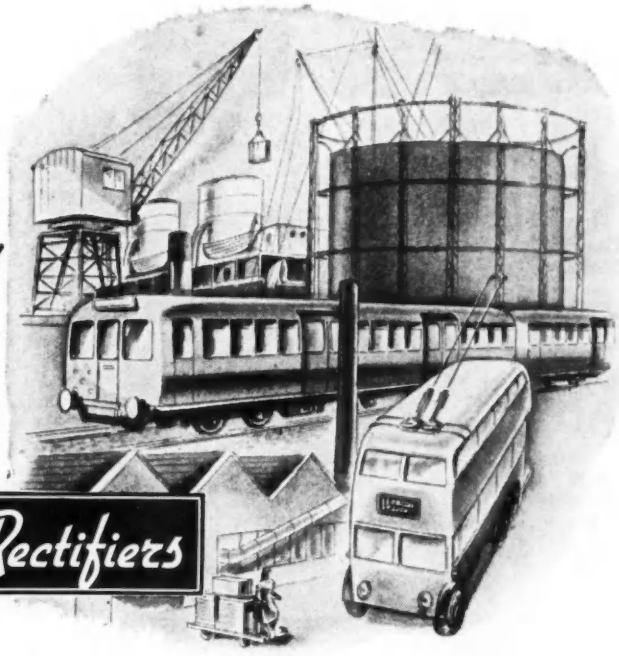
### *Shortage of Industrial Capital*

After dealing with the progress of the subsidiary companies, Sir Alexander refers to the growing shortage of industrial capital generally and its serious consequences to the productive capacity of industry as a whole. He continues: The shortage of industrial capital results, of course, from the dangerous inflationary practices of the past few years, but unfortunately because the effects are more insidious and concern us less immediately than the more obvious fall in the purchasing power of our money, it has not until recently received the wider attention it deserves. I cannot stress too strongly, however, that if this tendency continues it will have a catastrophic effect on our whole economic life.

The sellers market has gone. Competition from countries where longer hours are worked and lower wages paid, where possibly greater production per man hour exists in certain trades, and where the urge to recapture lost markets is now the paramount aim, cannot any longer be ignored, or its effect underestimated.

What lies ahead is beyond the wit of most of us to foresee, but if the Nation could recapture the spirit of 1939-45 and cast out the doctrines which all too frequently disrupt the team effort of the people, we could then with confidence look for the restoration of better times and the improvement of our world position.

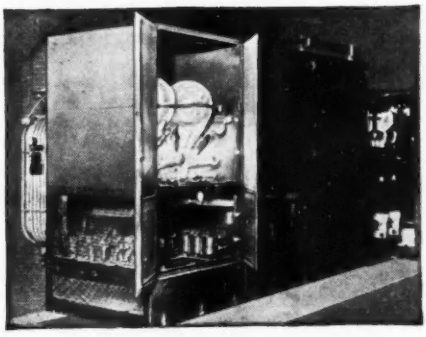
*Wherever*
**D.C.**
*is required from an*
**A.C.**
*supply-*



**Hewittic Rectifiers**

DIRECT CURRENT is the essential or preferable form of electric supply for a host of industrial applications, e.g. electric railways, trams and trolleybuses, mining traction, cranes, conveyors, electrolytic processes, rolling mill, printing press and variable-speed machine-tool drives, operating magnetic plant, charging batteries. . . .

It is most efficiently and economically obtained from the usual a.c. supply system by using Hewittic rectifiers, the modern electronic converting equipment—static in operation, simple, supremely reliable, easily installed (due to unit construction) in less space than is required by obsolescent rotating plant, requiring negligible maintenance, operating UNATTENDED.



*A Hewittic industrial rectifier, capacity 600 kW*

**OVER 1¼ MILLION KW IN WORLD-WIDE SERVICE**

**HACKBRIDGE AND HEWITTIC ELECTRIC CO. LTD., WALTON-ON-THAMES, SURREY**

*Telephone: Walton-on-Thames 760 (8 lines) Telegrams: "Electric," Walton-on-Thames*

*"A job to be proud of!"*

**What satisfaction in a job well done. It is *inevitable* with Metallic quality and consistent accuracy.**

Screwed and Socketed Conduit Thread.

Sunk-type Switch Iron Cover.

Sunk-type Plug Fitting Iron Cover.

Direct Mounting Flat-type Ceiling Rose.

*It always pays to SPECIFY* METALLIC

# CONDUIT TUBE & FITTINGS

A TI COMPANY

**THE METALLIC SEAMLESS TUBE Co. Ltd., Ludgate Hill, BIRMINGHAM 3. Tel. CEN 7167**

**Also at London, Newcastle-on-Tyne, Leeds, Swansea and Glasgow**

# CLASSIFIED ADVERTISEMENTS

OFFICIAL TENDERS AND APPOINTMENTS

WANTED · FOR SALE WORK WANTED

Those wishing to advertise in these pages should send the text to the Classified Advertisement Dept., Electrical Times, Sardinia House, Sardinia Street, London W.C.2, before 10 a.m. on TUESDAY of week of issue. Official Displayed Advertisements are charged at 42s. per inch, and all other classified advertisements at 3s. per line. Situations Wanted will be published four times for twice the single insertion rate. Fee for Box No. and postage on replies is 2s.

## TENDERS INVITED

### WELLINGTON (SALOP) URBAN DISTRICT COUNCIL

CLASS "A" LIGHTING—HOLYHEAD ROAD A.5, WELLINGTON

TENDERS are invited for the SUPPLY, ERECTION, and PUTTING INTO SERVICE of a system of 55 LIGHTING UNITS on a portion of the Holyhead Road within the Urban Area. Services to the lamps will be supplied by the Midlands Electricity Board.

Drawings may be seen, during normal office hours, at, and conditions of Tender and Contract, and Specification may be obtained from, the office of the Engineer and Surveyor, Mr. A. G. Barton, M.I.Mun. E.

Tenders, in plain sealed envelopes endorsed "Class 'A' Lighting Holyhead Road," must be delivered to the undersigned not later than mid-day on Friday, June 20, 1952.

The Council does not bind itself to accept the lowest or any tender.

B. H. J. RENSHAW,
Clerk of the Council.

Council Offices,
14 Walker St.,
Wellington, Shropshire.
May 29, 1952. (A 133)

## APPOINTMENTS VACANT

*Engagement of persons must be made through a Local Labour Office or Scheduled Employment Agency, if the applicant is a man aged 18-64, or a woman aged 18-59; unless the person concerned is excepted or the employment is in a managerial or professional capacity, or is otherwise excepted from the provisions of the Notification of Vacancies Order, 1952.*

### BRITISH ELECTRICITY AUTHORITY

*Midlands Division*

GENERAL ASSISTANT ENGINEER required in the System Operation Department at Divisional Headquarters, Birmingham. N.J.B. service conditions, superannuable appointment, salary within Schedule C, Grade 8, £481 to £619, ultimately rising to £694.

Duties are of a general statistical and technical nature associated with the group operation of power stations, and the successful applicant will be required to carry out shift duties as necessary in the System Control Room. Higher National Certificate in electrical engineering or equivalent qualifications required, and preferably graduate membership of the Institution of Electrical Engineers. Experience in a power station will be an advantage.

Application forms available from the Establishments Officer, 53 Wake Green Road, Moseley, Birmingham 13, to be completed and returned not later than June 28, 1952.

F. W. LAWTON,
Divisional Controller
(A 143)

### BRITISH ELECTRICITY AUTHORITY

*North Western Division*

BOILER HOUSE SUPERINTENDENT required at Barton Generating Station, nr. Manchester. Salary £808 to £841 (N.J.B. H.6). Apply to Establishments Officer, British Electricity House, 825 Wilmslow Road, Manchester 20, before June 21. Quote Vacancy No. 738. (A 135)

### NORTH WESTERN ELECTRICITY BOARD

APPOINTMENT of:—

(1) SENIOR DRAUGHTSMAN (BUILDING);
(2) SENIOR DRAUGHTSMAN (ELECTRICAL);
(3) ENGINEERING DRAUGHTSMAN (ELECTRICAL);
(4) ENGINEERING DRAUGHTSMAN (BUILDING).

No. 1 Sub-Area Headquarters, Manchester.

Applicants for (1) should have received a technical education up to H.N.C. (Building) level and have had considerable experience in the preparation of estimates and complete working drawings of all types of substations and office buildings, etc.

Applicants for (2) should have had a good technical training and drawing office experience in the electrical design, layout and detailing of indoor and outdoor substations up to and including 33 kV, and preparation of protection system schematic and wiring diagrams. Preference given to holders of H.N.C.

Applicants for (3) should have had a suitable technical education and good drawing office training. Experience of distribution network apparatus an advantage.

Applicants for (4) should have a sound knowledge of building construction and be able to prepare fully detailed drawings. Knowledge of substation building construction an advantage.

Salary ranges: Posts (1) and (2) £547/£651 p.a., N.J.B. Schedule D, Grade 5.
Posts (3) and (4) £413/£547 p.a., N.J.B. Schedule D, Grade 6.

Entry according to experience and qualifications.

APPOINTMENT OF SECTION HEAD (STATISTICS), TECHNICAL ENGINEER'S DEPARTMENT

No. 1 Sub-Area, Manchester.

Applicants should have had a good education and training in advanced statistical work. The duties require a wide experience of the Electricity Supply Industry and a knowledge of statistics particularly as applied to the production of records and charts.

Salary: £755 £845 p.a. N.J.C. conditions.

Applications for the above posts to the Sub-Area Secretary, No. 1 Sub-Area, The North Western Electricity Board, Town Hall, Manchester 2, P.O. Box 493, by June 21, 1952. (A 148)

### BRITISH ELECTRICITY AUTHORITY

*North Western Division*

VACANCY NO. 733—FIRST ASSISTANT STATION CHEMIST, at Stuart Street Generating Station, Manchester 11. Salary £660 £685 (N.J.B. H.9). Applicants should preferably hold a University Degree of Associateship of Royal Institute of Chemistry, but consideration will be given to those with H.N.C. studying for A.R.I.C., or equivalent qualification. Wide experience in chemical analysis is essential and knowledge of chemical testing of coal, water and oil in connection with power plant is desirable.

Apply to Establishments Officer, British Electricity House, 825 Wilmslow Road, Manchester 20, before June 21. Quote vacancy No. (A 128)

### SOUTH EASTERN ELECTRICITY BOARD

SECOND ASSISTANT DISTRICT ENGINEER
Crawley District

SALARY £539-£566 p.a., under N.J.B., "B." 7. Superannuable. Candidates should be qualified and have had training in distribution engineering and subsequent experience in the construction, operation and maintenance of urban and rural systems up to 30 kV. The duties will involve standby.

Applications, giving two referees, should reach F. A. Avery, A.I.E.E., Crawley District Manager, SEEBoard, 55 High Street, Crawley, by June 23, 1952.

A. L. BURNELL,
Secretary.
June, 1952. (A 154)

## CITY COUNCIL OF SINGAPORE

*Electricity Department*

30 VACANCIES

THE COUNCIL has under construction a new power station for which orders have been placed for 4 x 25,000-kW turbo-alternators, together with 6 x 157,000 lb boilers at 600 lb p.s.i., 325° F., switchgear and ancillary equipment. The ultimate capacity of this station will be 150,000 kW.

To meet this large-scale expansion, the Council invites applications for the following posts on the permanent establishment of the Electricity Department. Appointments will be on a three-years' agreement in the first instance. The age of retirement for officers on the permanent establishment is 55.

| Post Ref. No. | Description | Minimum age | Approx. initial total salary and allowances £ p.a. |
|---|---|---|---|
| 5 | Junior Public Lighting Engineer | 23 | 1,557 |
| 11 | Junior Technical Assistant | 28 | 2,037 |
| 14 | Construction Engineer | 28 | 2,037 |
| 19/23 | Control Engineers | 26 | 2,037 |
| 33/35 | Assistant District Engineers | 25 | 2,037 |
| 37 | Power Station Superintendent | 33 | 2,681 |
| 38 | Assistant Power Station Superintendent | 31 | 2,317 |
| 42 | Combustion Engineer | 28 | 2,037 |
| 43/47 | Charge Engineers | 28 | 2,037 |
| 48 | Chemist | 28 | 2,037 |
| 49 | Assistant Maintenance Engineer (Boiler House) | 25 | 1,874 |
| 51 | Assistant Maintenance Engineer (Electrical) | 25 | 1,874 |
| 52/56 | Junior Charge Engineers | 24 | 1,618 |
| 57/61 | Boiler House Shift Engineers | 24 | 1,618 |
| 66 | Assistant Maintenance Engineer (Electrical) (St. James) | 24 | 1,736 |
| 73 | Meter Superintendent | 30 | 2,317 |
| 79 | Assistant Secretary | 28 | 2,037 |
| 83 | Hiring Engineer | 28 | 2,037 |
| 84 | Junior Hiring Engineer | 23 | 1,495 |
| 85 | Stores Superintendent | 26 | 1,557 |
| 86 | Junior Commercial Engineer | 25 | 1,557 |

Salaries are payable in Malayan dollars, $1—2.4. The above figures of initial total salary and allowances include the basic salary and current variable expatriation and cost-of-living allowances. The cost-of-living allowance used for calculation is that applicable for a married man with one or more dependent children.

Partly furnished quarters provided, if available, at 5% of basic salary or rent allowance (at present 12% of basic salary, maximum $120 per month) paid in lieu. Passages will be provided for each officer appointed, his wife and children under the age of 12 years at the date of sailing (up to a maximum of three full passages).

Leave: one month per year of service, plus period of voyage, on satisfactory completion of agreement or four days a month of resident service, plus voyage leave after 48 months, if appointed to the permanent staff, and thereafter at shorter periods. Fourteen days local leave per year.

Compulsory Provident Fund contributions at present 7½% of salary plus expatriation allowance to which the City Council donates 7½%, rising to 10% after 10 years' service, 15% after 15 years' service and 20% after 20 years' service. This scheme is under review.

Please write briefly, giving details of qualifications, experience and age, etc., to Peirce & Williams (agents to the City Council), 1 Victoria Street, London S.W.1.

A memorandum giving details of all appointments will be sent to applicants considered suitable, who will then be asked to submit in DUPLICATE their full applications.

Closing dates for full applications:—
Posts 19/23, 37, 38, 43/47, and 48, Tuesday, June 24.
Remaining posts, Tuesday, July 1.

Applicants applying earlier will be considered immediately. (A 157)

## BRITISH ELECTRICITY AUTHORITY

*South Eastern Division*

SHIFT CHARGE ENGINEERS

Croydon "B" Power Station

APPLICANTS should have had suitable technical training together with extensive experience in the operation of modern high-pressure turbine and boiler plant, e.h.t. switchgear and in the administration and control of labour. Preference will be given to those with P.F. experience. N.J.B. conditions of service and salary Class "J," Grade 7, £831/12/- per annum, including London Allowance.

Applications, on forms obtainable from Station Superintendent, Croydon "B" Generating Station, Beddington Farm Lane, Purley Way, Croydon, Surrey, to arrive by June 23. (A 156)

## BRITISH ELECTRICITY AUTHORITY

*South Wales Division*

APPLICATIONS invited for the following superannuable appointments. N.J.B. conditions.

1. ASSISTANT SHIFT CHARGE ENGINEER, Upper Boat Power Station, nr. Pontypridd. H.9 (£660 to £685 per annum).

2. STATION CHEMIST, Upper Boat Power Station, H.7 (£747 to £778 per annum).

3. ASSISTANT SHIFT CHARGE ENGINEER, Llynfi Power Station. G.9 (£621 to £648 per annum).

For appointments 1 and 3 experience in a modern Generating Station essential. Preference given to candidates possessing the Higher National Certificate or equivalent and who have served a regular apprenticeship. For 2, applicants should preferably possess the B.Sc. degree in Chemistry and/or be Associate Members of the Institute of Chemistry or have obtained equivalent qualifications and should have had sound experience in water treatment chemistry, coal and oil testing, and corrosion problems.

Application forms, obtainable from the Divisional Secretary at the address below, should be returned by June 26, 1952.

H. J. BENNETT,
Divisional Controller.

British Electricity Authority,
Cardiff (Pengam Moors) Airport,
Cardiff.
June 4, 1952. (A 141)

## IMPERIAL CHEMICAL INDUSTRIES LIMITED

*Wilton Works*

ADVERTISEMENT REFERENCE ICI X/115

IMPERIAL CHEMICAL INDUSTRIES LIMITED is developing a large chemical factory at Wilton Works, near Redcar, in Cleveland, Yorkshire.

There are openings on the permanent staff of this expanding organisation for young MECHANICAL AND ELECTRICAL ENGINEERS.

Training will be given in design, construction, maintenance and operational work according to previous experience or aptitude.

Candidates should have a good Honours Degree or associate membership of the appropriate institution. Some previous experience in industry or the Services would be of advantage, but men graduating this year will be considered.

Pension scheme, recreation club, etc.—Write for application form to the Staff Officer, Imperial Chemical Industries Limited, Wilton Works, P.O. Box 54, Middlesbrough, Yorkshire, quoting advertisement reference ICI X/115/d. (A 159)

## CUMBERLAND EDUCATION COMMITTEE

*Cumberland Technical College, Workington*

*Principal:* J. Farmery, B.Sc. (Eng.), A.M.I.E.E., A.M.I.Mech.E., A.M.I.P.E.

APPLICATIONS are invited for the post of ASSISTANT to teach Electrical Engineering Subjects up to National Certificate standard. The post is at present Grade "A" of the Burnham Further Education Report, viz., £375 by £18 to £630, with appropriate allowances. Up to twelve increments will be allowed for approved industrial experience. The College is approved for Higher National Certificates in Electrical Engineering, and the successful candidate will be given the opportunity to teach these courses, if he so desires. Particulars of the post, together with a form of application, may be obtained from the Registrar, Cumberland Technical College, Workington, and completed applications should be returned to the Principal, not later than two weeks following the appearance of this advertisement.

GORDON S. BESSEY,
Director of Education.

5 Portland Square,
Carlisle. (A 127)

## YORKSHIRE ELECTRICITY BOARD

APPLICATIONS are invited for the following appointments:—

*No. 6 (Hull) Sub-Area*

GENERAL ASSISTANT DISTRICT ENGINEER (No. 3 (Goole) District (Pocklington) (Vacancy No. 65/52)

Applicants should hold the Higher National Certificate in Electrical Engineering or equivalent qualifications, and have had training and experience in the construction, operation and maintenance of h.v. and l.v. overhead and underground distribution systems.

The successful applicant will be required to reside in Pocklington and carry out standby duty.

Salary: N.J.B. Class D, Grade 11, £460 to £497 per annum.

Applications, stating the above vacancy number, and giving full details of age, qualifications and experience, should be forwarded to the Manager, No. 6 (Hull) Sub-Area, Yorkshire Electricity Board, Ferensway, Hull, not later than June 26, 1952. (A 144)

## EASTERN ELECTRICITY BOARD

APPLICATIONS are invited for the following appointments:—

CIVIL ENGINEERING AND BUILDINGS—SECOND ASSISTANT ENGINEER

Chilterns Sub-Area Headquarters, Bedford

Subject to guidance from the Board's architect at Wherstead, Ipswich, in the design of important works, the successful candidate will be in charge of the design, construction and maintenance of all buildings and civil engineering works, including substations, offices, service centres, stores and workshops. He will be required to supervise the execution of works under contract and to assist in the acquisition of land, including licensing and planning negotiations.

The salary will be in accordance with Class "K," Grade 7, of the National Joint Board Salary Agreement, commencing at £844 p.a.

Apply to the Manager, Chilterns Sub-Area, Eastern Electricity Board, Prebend Street, Bedford.

TWO ENGINEERING DRAUGHTSMEN (REF. 348)

Northmet Sub-Area Headquarters, Southgate, London N.14

Candidates should have had the requisite training and experience to enable them to prepare plans and detailed drawings of building and civil engineering works for substations, service centres, workshops and offices.

The salaries will be in accordance with Grade 6, Schedule "D," of the National Joint Board Salary Agreement, within a range of £438-£574 p.a., inclusive of London allowance.

Apply to the Manager, Northmet Sub-Area, Eastern Electricity Board, Cannon Hill, Southgate, London N.14.

Future salaries and conditions of service for the above appointments will be in accordance with agreements made from time to time by the appropriate negotiating bodies.

The successful candidates will be required to contribute to a superannuation scheme and may be required to undergo a medical examination.

Applications, stating age, education, qualifications and experience, with details of present appointment and salary, should be submitted to the Manager concerned within 14 days of the appearance of this advertisement. (A 158)

## LONDON ELECTRICITY BOARD

DISTRICT ENGINEER

APPLICATIONS are invited for the above position in the City District of the Northern Sub-Area.

Applicants must have the following qualifications and experience:—

A thorough theoretical and practical training with technical qualifications equivalent to the standard of Corporate Membership of the I.E.E., actual membership of which will be an advantage; a wide knowledge and experience in the operation of H.V. and M.V. distribution systems, both a.c. and d.c., including the operation and maintenance of Rotary Converters, and other types of d.c. plant supplying a d.c. system; a thorough knowledge and experience of the handling of staffs, both technical and manual; a knowledge of the operation and procedure at Works Committees would be an advantage.

The post is graded under Schedule "A" of the National Joint Board agreement as Class "F," Grade 3—£931 7s. per annum rising to £971 5s. per annum, inclusive of London Allowance.

Application forms obtainable from Establishments Officer, 46 New Broad Street, E.C.2, to be returned duly completed not later than June 21, 1952. Please enclose addressed foolscap envelope and quote ref: V 1474 T on all correspondence. (A 171)

## BRITISH ELECTRICITY AUTHORITY

*East Midlands Division*

Staff Vacancy No. 52/52

BOILER HOUSE SHIFT CHARGE ENGINEER

Longford Generating Station, Coventry

APPLICATIONS are invited from suitably qualified engineers to take charge of shift operation of boiler house plant at Longford generating station, Coventry.

Applicants must possess a sound technical training, have had good general engineering experience, a knowledge of the control and operation of large water tube boilers, ancillary plant and in the efficient combustion of fuels on chain grate stokers.

The salary will be in accordance with Class "G," Grade 9, of the National Joint Board Schedule "A" (£621-£648 p.a.), and the appointment will be pensionable within the provisions of the British Electricity Authority and Area Boards superannuation scheme.

Forms of application may be obtained from the Divisional Establishments Officer, British Electricity Authority, Barker Gate, Nottingham, and should be returned not later than June 23, 1952.

L. F. JEFFREY,
Divisional Controller.
(A 155)

## BRITISH ELECTRICITY AUTHORITY

*Yorkshire Division*

APPLICATIONS are invited for the following appointments in the Technical Department, Communications Section:—

(a) THIRD ASSISTANT ENGINEER. Salary £629-£834. N.J.B. Agreement.

Applicants should possess technical qualifications equivalent to I.E.E. Corporate Membership and have experience in automatic telephone and electronic signalling techniques. Works experience will be an advantage.

(b) GENERAL ASSISTANT ENGINEER. Salary £481-£674. N.J.B. Agreement.

(c) JUNIOR ENGINEER. Salary £375-£552. N.J.B. Agreement.

Applicants for (b) and (c) should possess technical qualifications leading to I.E.E. Corporate Membership. Some experience in automatic telephone or electronic signalling technique desirable.

Application forms obtainable from Divisional Secretary (Establishments), British Electricity Authority, British Electricity House, St. Mary's Road, Leeds 7, to be returned within 14 days of the appearance of this advertisement. (A 167)

## SOUTH WALES ELECTRICITY BOARD

REQUIRED, FOREMAN ELECTRICAL FITTER, in the Western Sub-Area of the Board, based on the Construction Department, Saundersfoot.

Applicants should have experience in the installation and maintenance of substation plant and equipment, preferably at voltages up to and including 33 kV.

The wages (3·8½ per hour) and conditions of service will be in accordance with the N.J.I.C. Agreement for the industry.

Applications, stating age, present position, salary, qualifications and experience, and giving three referees, to be addressed to the Manager of the Employment Exchange, Tenby, to arrive by June 21, 1952.

D. G. DODDS,
Secretary.
St. Mellons, Cardiff. (A 161)

## MIDLANDS ELECTRICITY BOARD

APPLICATIONS are invited for the following superannuable post:—

GENERAL ASSISTANT DISTRICT ENGINEER
(Dean Forest)

Experience necessary in all branches of Distribution Work including operation and maintenance of high and low voltage cables and overhead lines, substations, etc. Technical qualifications desirable. Salary £511-£527 per annum (N.J.B., Grade D.10). Apply within 14 days stating age, experience, present salary and position, and quoting ref. Glos.T.141 to Mr. D. Holt, Manager, Midlands Electricity Board, 126 London Road, Gloucester.

A. STEPHENS,
Secretary.
(A 126)

## NOTTS. EDUCATION COMMITTEE

*County Technical College, Worksop*

REQUIRED for September 1, 1952. ASSISTANT to take electrical engineering and allied subjects to Ordinary and Higher National Certificate standard. The post is Grade "B" on the Burnham Scale. Applicants should possess a degree or the equivalent.

Further particulars may be obtained from the Principal to whom applications should be made on the form provided which should be returned not later than 10 days after the first appearance of this advertisement.

J. EDWARD MASON,
Director of Education.
(A 55)

## MIDLANDS ELECTRICITY BOARD

THIRD ASSISTANT ENGINEER required at the Shropshire and Herefordshire Sub-Area Headquarters. Duties involve system planning, outdoor substation layouts, switchgear specifications, fault calculations, etc. Technical qualifications desirable. Salary £588-£610 per annum (N.J.B. Class "G," Grade 10). Superannuable.—Apply, within 14 days, stating age, experience, salary and position, to Sub-Area Manager, Midlands Electricity Board, Spring Gardens, Ditherington, Shrewsbury.

A. STEPHENS,
Secretary.
(A 160)

A TECHNICAL ASSISTANT for work in connection with electric lamps. Applicants should possess a degree or qualifications acceptable for Corporate Membership of the I.E.E. and be capable of acting as Secretary to Technical Committees.

Applications stating age, qualifications and experience should be sent to The Electric Lamp Manufacturers' Association, 25 Bedford Square, London W.C.1. (A 139)

AGENTS working on commission, with established connections with electrical retailers and contractors required by firm manufacturing well-known electrical accessories.—Reply stating area covered, commission required and other lines carried, to Box No. 1801, Electrical Times. (A 136)

APPLICATIONS are invited from ELECTRICAL ENGINEERS having at minimum Higher National Certificate for vacancies in Switchgear Contracts Department, Stafford. Previous contractual experience of large-scale switching schemes as applied to power stations, substations and special and general industrial applications desirable but knowledge of switchgear control metering and protection schemes essential. Permanent progressive staff appointments with pension scheme. Successful applicants will have to find own accommodation, but for a limited period, arrangements will be made for special financial assistance.—Apply, stating age, qualifications and experience, quoting ref. 446C, to Central Personnel Services, English Electric Co., Ltd., 24/30 Gillingham Street, London S.W.1. (A 72)

ASSISTANT MECHANICAL ENGINEER wanted for large Power Plant equipped with h.p. Water Tube Boilers, Turbines, and up-to-date auxiliaries. Applicants should have some years experience in this type of plant and possess a Higher National Certificate or its equivalent. Age not less than 32 or more than 45. Non-Contributory Pension scheme. Commencing salary £840. Position offers good prospects for a suitable man.—Reply to Box No. 1763, Electrical Times, quoting reference TME/2. (A 52)

CHARGE HAND required for assembly lines of small electrical mechanisms. Must be fully experienced in mass production methods. High rate and excellent prospects.—Details to Box No. 1805, Electrical Times. (A 145)

CONTRACT ENGINEERS required for cable construction work. Liberal subsistence allowance when working away.—Replies, stating experience and salary required to Contracts Departments, Pirelli-General Cable Works Ltd., Leigh Road, Eastleigh, Hants. (A 61)

DESIGN ENGINEER with specialised experience in low tension domestic switchgear. Must be conversant with design for mass production. A good starting salary is offered and there are excellent prospects for a first-class man having this specialist experience.—Write in full confidence, giving details of experience and salary required, to Box No. 1767, Electrical Times. (A 63)

DRAUGHTSMEN experienced in (a) small electric motors or (b) gyroscopes or (c) pre-production development of radio and radar airborne equipment or (d) detailing of sub-assemblies, fully dimensioned are required for work at Stanmore by the Research Laboratories of the General Electric Co. Ltd., Wembley, Middx.—Apply to the Staff Manager (Ref. GBLC/S/193) stating age and record. (A 138)

DRAUGHTSMEN required, preferably with experience in any of the following: design of circuit-breakers and metalclad switchgear, industrial control gear, switch and control board layout, diagrams of connections, traction control gear. Applications from good mechanical draughtsmen are also invited. Good remuneration for experienced men.—Apply, quoting "Switchgear," stating age, experience and salary required, to General Electric Co. Ltd., Witton, Birmingham 6, through your nearest Employment Exchange. (A 88)

EFFICIENCY ENGINEER. Large modern power station in London district invites applications from men not more than 45 years of age. Candidates must have had good power station experience, a knowledge of principles of combustion, heat balances, economics of plant operation and possess at least Higher National qualifications. Non-contributory pension scheme. Commencing salary £950 approximately. Very good prospects for a suitable man.—Reply to Box No. 1813, Electrical Times, quoting reference T/EE. (A 172)

ELECTRICAL ENGINEER with first or second Honours Degree in electrical engineering required immediately by South London Company with international connections. Some experience in high tension or power frequency is preferred. Age 21-30. Salary in accordance with age and experience.—Full details to Box ET 612, L.P.E. 110, St. Martin's Lane, W.C.2. (A 134)

ELECTRICAL ENGINEER. Unusually attractive opening occurs at high level for key sales executive with company of international repute. Degree in electrical engineering preferable. Successful applicant must have strong personality, good social background and be capable administrator.—Write, giving full details, salary expected, to Box E.T. 275, at 191 Gresham House, E.C.2. (A 70)

**BOX No. replies to be addressed to the ELECTRICAL TIMES, Sardinia House, Sardinia Street, London W.C.2**

ELECTRICAL ENGINEERS. The Steel Company of Wales, Ltd. (Steel Division), is about to form an Electrical Engineering Development Department to handle large extensions, and has the following vacancies. All applicants must possess an Electrical Engineering Degree (or equivalent) and must have had considerable experience in heavy industry (preferably in iron and steel works).

1. DEVELOPMENT ENGINEER to take full charge o the Department.
2. CO-ORDINATING ENGINEER to supervise commercial matters, office records, etc.
3. MACHINES AND CONTROL GEAR ENGINEER. Applicants must have had design experience with a leading manufacturer.
4. COMMUNICATIONS AND ELECTRONICS ENGINEER
5. CHIEF SITE ENGINEER for supervision and progressing of contracts and commissioning of plant.
6. FOUR ASSISTANT SITE ENGINEERS.
7. CHIEF DRAUGHTSMAN.

Applications should be in own handwriting addressed The Personnel Superintendent, The Steel Company of Wales Limited, Box No. 3, Port Talbot. (A 123)

ELECTRICAL ENGINEER required for Electrical Department of Works in the North East. Should have a sound practical training, drawing office experience, a knowledge of motor control-gear resistance calculations, and preferably some experience of electrical heating for Industrial applications. Apply, giving full details of experience, technical qualifications, age, whether married or single, and salary required to Box No. 1803, Electrical Times. (A 147)

ELECTRICAL ENGINEER required with works and drawing office experience. To calculate quantities and allowances of raw materials and compile schedules for ordering. To assist also with technical and sales correspondence in connection with relays and small electrical equipment.—Apply in writing, giving details of age, education, technical training experience and salary required, to the General Manager, 392 Bath Road, Slough, Bucks. (A 146)

ENGLISH ELECTRIC CO., LTD., have vacancies for JUNIOR PRODUCTION ENGINEERS at their Stafford works. These positions call for initiative and ability, with the Ordinary National Certificate in mechanical/production engineering as minimum qualification. The work is concerned with the production, development, methods, processes and works layout entailed in the manufacture of high-voltage switchgear to batch and customers' orders. Experience of switchgear is not essential.—Write, giving full details and quoting ref. "English Electric 903B," to Westminster Employment Exchange, Chadwick Street, London, S.W.1. (A 173)

ENGINEER REQUIRED. An old established cable manufacturing organisation requires an engineer experienced in general electrical engineering, particularly generation and distribution, and combining commercial knowledge for a sales company in Karachi. Professional qualifications desirable, but sound all-round experience essential. Good salary and expenses and excellent prospects for the right man who would join the Board of the local company in Pakistan.—Write: Box No. 1795, Electrical Times. (A 112)

EWBANK AND PARTNERS, LTD. have vacancies for the following:—

ELECTRICAL ENGINEERING DRAUGHTSMEN experienced in Power Station and sub-station distribution systems.

MECHANICAL ENGINEERING DRAUGHTSMEN experienced in Power Station design and layout, pipework layout, circulating water systems or coal and ash handling plants.

TRACERS (FEMALE) experienced in Power Station and general engineering work.

The positions are permanent and are pensionable. Free lunches are provided and a five day week is in operation. Applicants should write in first instance, stating age, details of experience and salary required, to: The Secretary, Ewbank and Partners Ltd., Engineering Consultants, 10/11 Grosvenor Place, S.W.1. (A 174)

HOUSES are immediately available for DRAUGHTSMEN with switchgear or light electro-mechanical experience, who are successful applicants for vacancies which exist in a well-known Merseyside engineering company. Progressive positions are offered in expanding contracts or development drawing offices. Modern factory; pleasant situation. Pension scheme in operation, after qualifying period.—Write, giving full details, age, qualifications and present salary, to Box No. 1779, Electrical Times. (A 86)

LIGHTING Department (London Office) of E.L.F.A. manufacturer requires SALES ESTIMATOR. Knowledge of lighting equipment essential.—Apply: Veritys Ltd. (Ref. MBS), Brettenham House, Strand, London, W.C.2. (A 152)

*Engagement of persons must be made through a Local Labour Office or Scheduled Employment Agency, if the applicant is a man aged 18-64, or a woman aged 18-59; unless the person concerned is excepted or the employment is in a managerial or professional capacity, or is otherwise excepted from the provisions of the Notification of Vacancies Order, 1952.*

MANAGER to control the production and Commercial Department of a Company manufacturing Capacitors for power factor correction. Candidates must have a first-class technical background with ability to initiate and carry through technical development and secure an efficient level of output. Previous responsible experience in this specialised field would be an advantage.—Applications stating age, particulars of education, technical training and subsequent industrial responsibility and salary grouping should be sent to Box No. 1799, Electrical Times. (A 129)

MANUFACTURERS of domestic electrical washing appliances require COMMISSION AGENTS for the following Electricity Board areas: Eastern, Midlands, London, Southern, South Eastern, South Western.—Only those who have first-class connections with Electricity Boards and wholesalers need apply to Box No. 1769, Electrical Times. (A 64)

PERMANENT positions with excellent opportunities will be offered to applicants suitably qualified for the following:—

(a) DESIGNERS experienced in electronic control gear. Good electrical and mechanical design and layout ability essential.

(b) SENIOR DRAUGHTSMEN with electrical/mechanical experience required for motor control gear, knowledge of electronics advantageous. Thorough shop training and extensive drawing office experience essential.

(c) DRAUGHTSMEN required for mechanical and electrical work on industrial electronic equipment. Experience on this type of product, whilst an advantage, is not essential and men with good electrical or mechanical drawing office experience will be considered.

Vacancies exist in a new factory in the Stoke-on-Trent area or in the company's London office.—Replies, giving full details of training experience, also age and salary required, and quoting ref. AGI, to be sent to Box No. 1775, Electrical Times. (A 71)

PRODUCTION ENGINEER required for S.W. London area. Must have wide experience and be fully conversant with mass production methods of manufacture and assembly of small electrical mechanisms. High salary and excellent prospects to suitable applicant.—State full details of experience to Box No. 1807, Electrical Times. (A 153)

REPRESENTATIVES. Rolls Switches Ltd., are now appointing full-time representatives for the London area. The finest design in the world, best quality materials, a performance of more than 250 times the British Standards Specification requirements, coupled with competitive prices, make Rolls Switches virtually self-selling.—Fully experienced men with well-established and strong personal connections, having proved sales records are invited to write fully stating area covered and other relevant information, which will be treated in the strictest confidence, to the Managing Director, Rolls Switches Ltd., 154/6 Blackfriars Road, London S.E.1. (A 130)

SALES ENGINEER required by leading manufacturer of motor control gear. Must possess electrical degree and have had considerable experience in selling starters, contactors and relays. The position is for a senior executive and has excellent possibilities.—Write, stating full particulars of experience and salary required, to Box No. 1809, Electrical Times. (A 162)

SENIOR DESIGNER ENGINEER required by Sunvic Controls Limited at their Harlow Factory for development of Domestic control apparatus. The position offers excellent and progressive prospects for a suitable man. Applicants should have an engineering degree or equivalent, and have had some years experience on design for mass production. Preference will be given to experience in Domestic apparatus.—Applications stating age, experience and present salary to Chief Engineer, Sunvic Controls Limited No. 1 Standard Factory, Eastern Industrial Estate, Harlow, Essex. Quoting reference Engineer/Domestic. (A 140)

TECHNICAL INSTRUCTOR required by large oil company for Middle East, to supervise and assist in on-the-job training of electrical tradesmen and apprentices. Applicants apprentice-trained and holding H.N.C., should have had practical and instructional experience. Substantial allowances in addition to salary. Pension fund. Biennial (paid) home leave. No married accommodation for first tour. Age limit 27-40.—Write, quoting No. 212, to Box 5923, c/o Charles Barker & Sons, Ltd., 31 Budge Row, London E.C.4. (A 168)

TRANSFORMERS & WELDERS, LTD., Sandown Road, Watford, have vacancies for fully experienced TRANSFORMER DRAUGHTSMEN. Specialised knowledge of arc furnace transformer design an advantage. Please give full details of experience, age, and salary expected. (A 176)

WANTED, energetic SALES MANAGER for light electro mechanical engineers in the north of England to develop sales of existing lines and to create markets for products in design stage. Only first-class men with plenty of drive, initiative and engineering background, around 35 years of age, should apply. Assistance with housing will be given and applicants should give full details of education, experience and salary required. Exceptional opportunity for the right man who will be required to visit Continent and U.S.A.—Write Box No. 1751, Electrical Times. (A 45)

WANTED immediately, experienced MAINTENANCE ELECTRICIAN. 42-hour week. Good rates. Excellent working conditions. Protective clothing supplied and laundered free.—Apply Personnel Department, Van den Berghs and Jurgens Ltd., Stork Margarine Works, Purfleet, Essex. (A 137)

YOUNG ELECTRICAL ENGINEER required by leading manufacturers of small switchgear. Must possess electrical or science degree. Some commercial experience would be an advantage. Good opening for an ambitious man.—Write giving full details and salary required to Box No. 1815, Electrical Times. (A 175)

## APPOINTMENTS WANTED

CONTRACTING ELECTRICIAN, 31, exp. estimating, desires position anywhere in Gt. Britain in supervisory capacity which requires initiative, drive and imagination.—Box No. 1745, Electrical Times. (A 42)

SCOTS business executive, age 36, offering liberal education, well travelled, economics background, 12 yrs. broad varied administrative experience, viewpoint, at high level, seeks Personal Assistantship to Managing Director or similar opening Electrical or Allied Industry. —Box No. 1787, Electrical Times. (A 106)

## WORK WANTED

A.C. and d.c. Motor Rewinds and Repairs. Prompt service, fully guaranteed. Edgware 8631 (4 lines). —Service Electric Co. Ltd., Stanmore, Middx. (A 19)

CAPACITY AVAILABLE for small component and sub-assembly work. Any quantities considered. Work can start immediately.—Box No. 1789, Electrical Times. (A 107)

CASTINGS. Fisher Foundries Ltd., Greet, Birmingham, have capacity for brass, gun metal and soft grey iron machine moulded repetition castings weighing 1-30 lb. Loose pattern work up to 3 cwt. Delivery by road to all parts. Tel.: B'ham, Victoria 0197. (A 25)

METALWORK. All types, cabinets, chassis, racks, etc., to your own specifications.—Philpott's Metalworks Ltd., Chapman Street, Loughborough. (A 26)

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# INDEX TO ADVERTISERS


Alton Battery Co., Ltd. ... 13
Aron Electricity Meter, Ltd. ... 18
Austin & Hayes, Ltd. ... ... 66
Automatic Light Controlling Co., Ltd. ... ... ... ... 50
Automatic Telephone & Electric Co., Ltd. ... ... ... 65
Banner Electric Co., Ltd. ... 68
Bayliss, Jones & Bayliss, Ltd. ... 27
Belling & Co., Ltd. ... ... 6
Bill Switchgear, Ltd. ... ... 5
British Electrical Repairs, Ltd. 55
British Insulated Callender's Cables, Ltd. ... ... ... 9
British Power Transformer Co., Ltd. ... ... ... ... 20
British Thomson-Houston Co. Ltd. ... ... ... ... 30
Burn, George, Ltd. ... ... 58
Canusa, Ltd. ... ... ... ... 11
Carter, B. & F., & Co., Ltd. ... 68
Chamberlain & Hookham, Ltd. 57
Clang, Ltd. ... ... ... 20
Connollys (Blackley), Ltd. ... 60
Copper Development Association ... ... ... ... 29
Cressall Manufacturing Co., Ltd. 4
De La Rue, Thomas, & Co., Ltd. 37
Desoutter Bros., Ltd. ... ... 19
D.P. Battery Co., Ltd. ... ... 56
Drake & Gorham Wholesale, Ltd. ... ... ... ... 64
Drummond, John (Engineers), Ltd. ... ... ... ... 64
Edison Swan Electric Co., Ltd. 32
Ega Electric, Ltd. ... ... 52
Ekco-Ensign Electric, Ltd. ... 16
Electric Construction Co., Ltd. 40
Electrical Instrument Co. (Hillington), Ltd. ... ... 58
Ellison, George, Ltd. ... ... 38
Enfield Cables, Ltd. ... ... 17
English Electric Co., Ltd. 3, 67
Falk, Stadelmann & Co., Ltd. ... 14
Ferguson Pailin, Ltd. ... ... 22
Ferranti, Ltd. ... ... ... 69
Ferranti, Denis, Co., Ltd. ... 72
General Electric Co., Ltd. 28, 33
Grimmer, W. H. ... ... ... 50
Grubb Engineering Co., Ltd. 21
Hackbridge Cable Co., Ltd. 52
Hackbridge & Hewittic Electric Co., Ltd. ... ... ... 41
Heayberd, F. C. & Co., Ltd. ... 60
Henley's, W. T., Telegraph Works Co., Ltd. ... ... 1
Heyes & Co., Ltd. ... ... 54
Hick Hargreaves & Co., Ltd. ... 72
Igranic Electric Co., Ltd. ... 12
International Combustion, Ltd. 25
Johnson & Phillips, Ltd.... 31, 63
Measuring Instruments (Pullin), Ltd. ... ... ... ... 8
Metafiltration Co., Ltd. ... ... 34
Metallic Seamless Tube Co., Ltd. 42
Metropolitan Electric Cable & Construction Co., Ltd. ... 35
Metway Electrical Industries, Ltd. 8
Micanite & Insulators Co., Ltd. 2
M.K. Electric, Ltd. ... ... 59
Nettle Accessories, Ltd. ... 4
Nevelin Electric Co., Ltd. ... 53
New Day Electrical Accessories, Ltd. ... ... ... ... 50
Oddie, Bradbury & Cull, Ltd. ... 20
Oliver & Boyd ... ... ... 58
Parnall (Yate), Ltd. ... ... 71
Ransome & Marles Bearing Co., Ltd. ... ... ... ... 23
R.C. Radio-Electric, Ltd. ... 64
Revo Electric Co., Ltd. ... 36
Reyrolle, A., & Co., Ltd. ... 15
Salter, George, & Co., Ltd. ... 51
Sanders, Wm., & Co. (Wednesbury), Ltd. ... ... ... 8
Scholes, Geo. H., & Co., Ltd. ... 26
Seal-Lees Strapping, Ltd. ... 34
Siemens Electric Lamps & Supplies, Ltd. ... ... ... 24
Small Pressure Die Castings (Bacup), Ltd. ... ... ... 68
Sperryn & Co., Ltd. ... ... 62
Standard Telephones & Cables, Ltd. ... ... ... ... 70
Statter, J. G., & Co., Ltd. ... 64
Sturdy Electric Co., Ltd. ... 4
Symonds, R. H., Ltd. ... ... 68
Thorn Electrical Industries, Ltd. 7
Transformer & Electrical Co., Ltd. ... ... ... ... 66
Veritys, Ltd. ... ... ... 61
V.G. Manufacturing Co., Ltd. ... 54
Wandleside Cable Works, Ltd. 66
Weir, G. & J., Ltd. ... ... 66
Wootton & Co., Ltd. ... ... 56
Yorkshire Switchgear & Engineering Co., Ltd. ... ... 10
Zenith Electric Co., Ltd. ... 62



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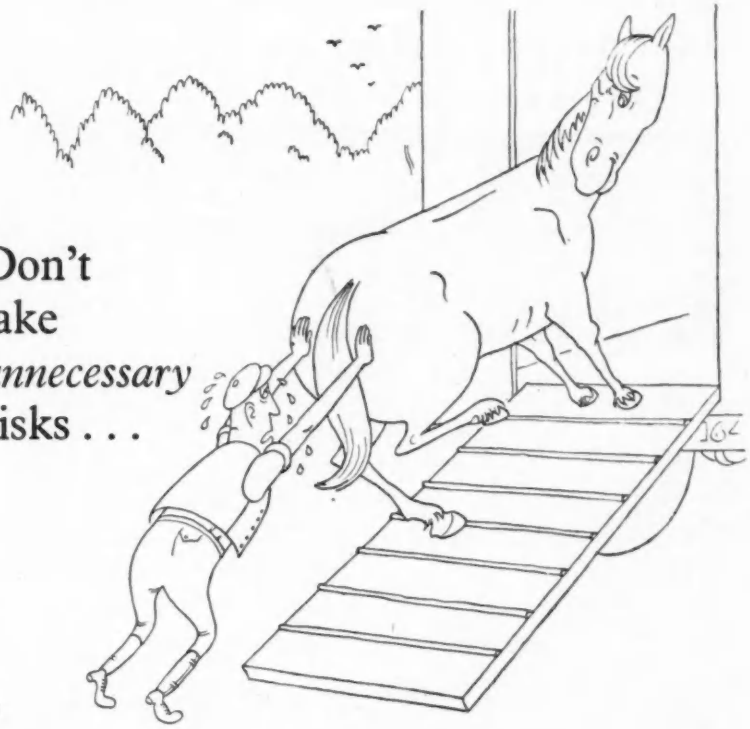

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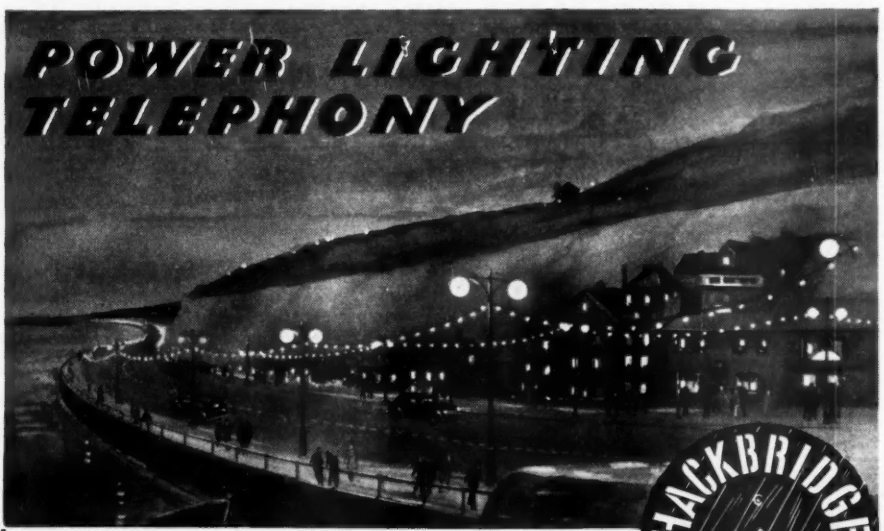


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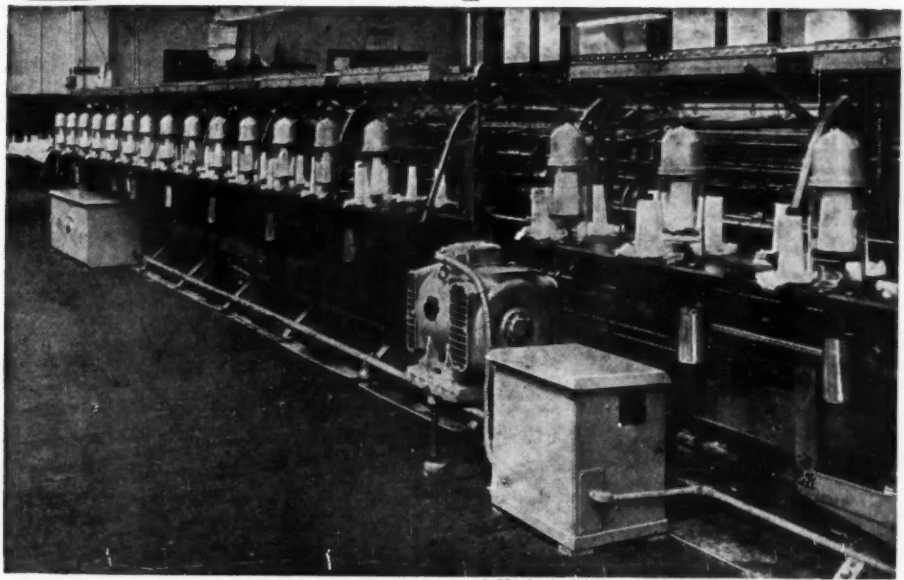

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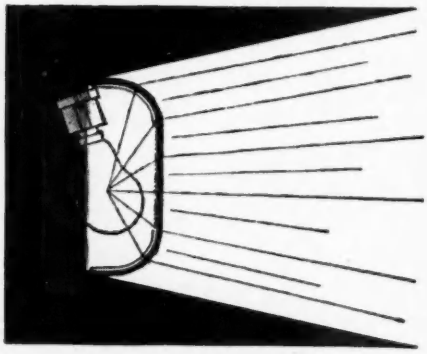

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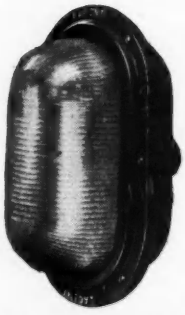

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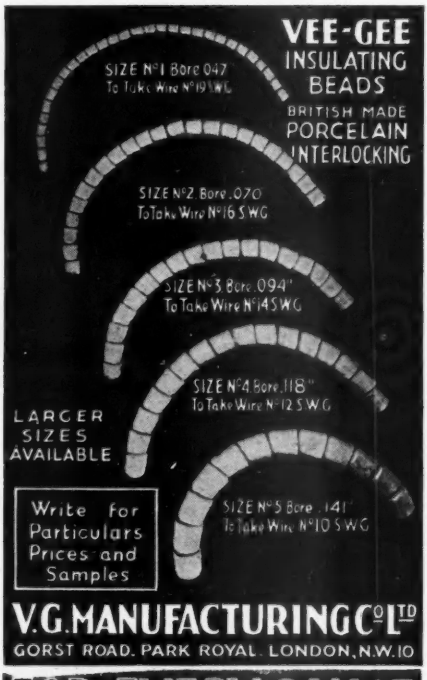
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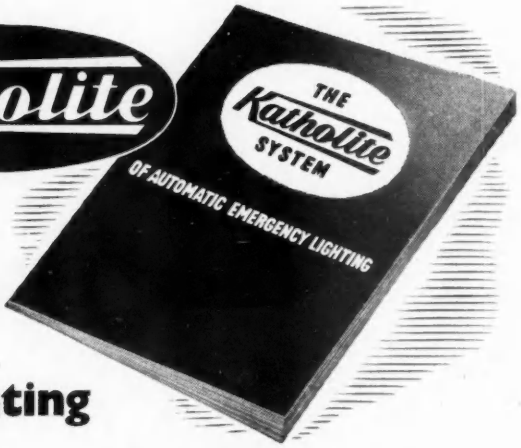


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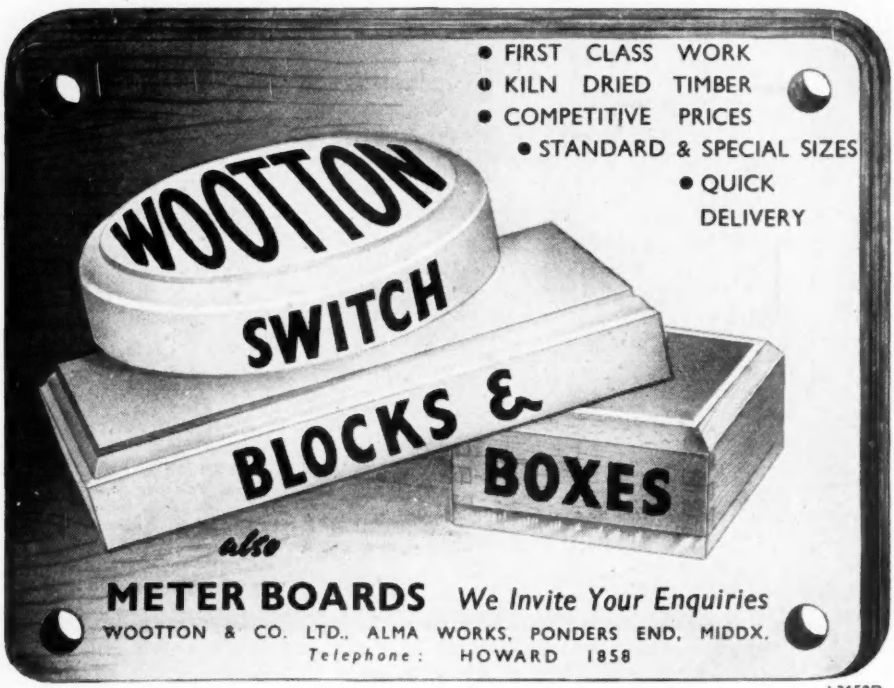


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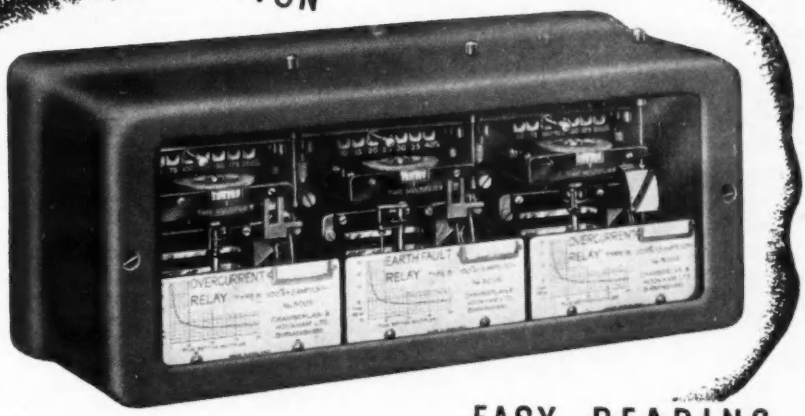


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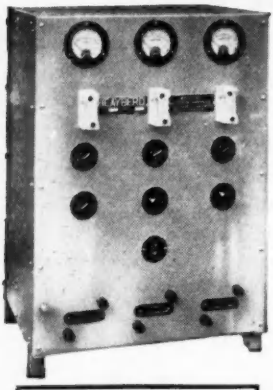

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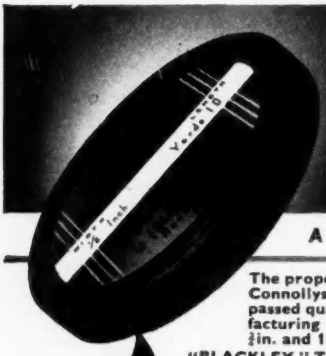

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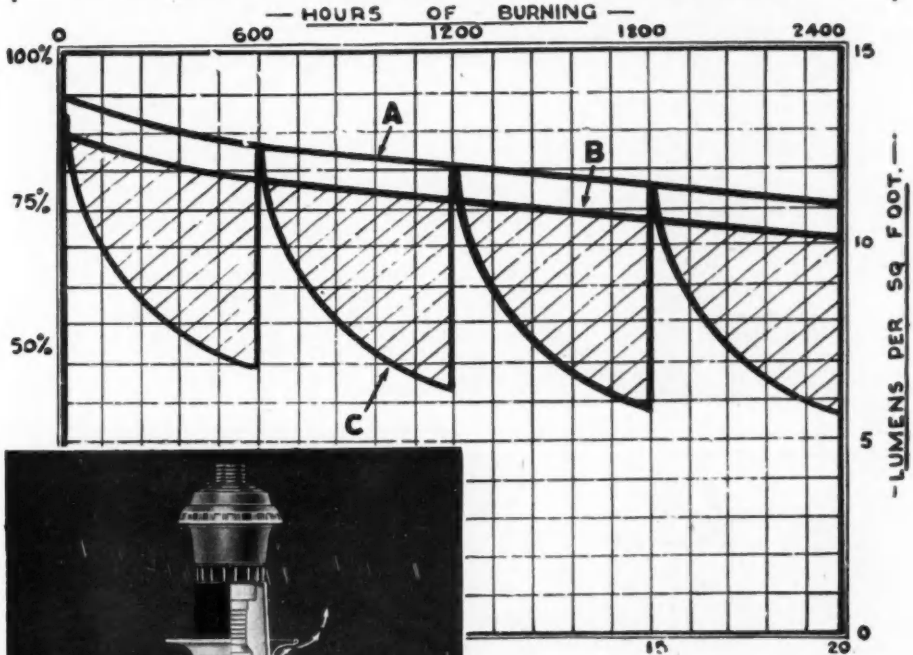


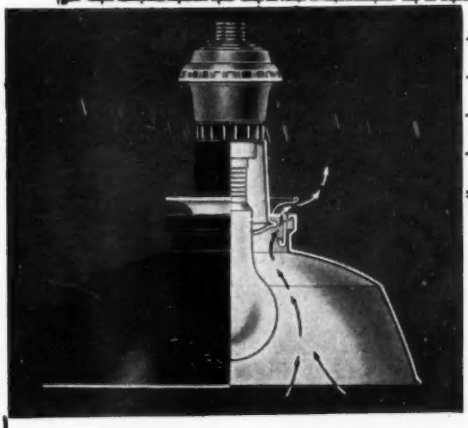

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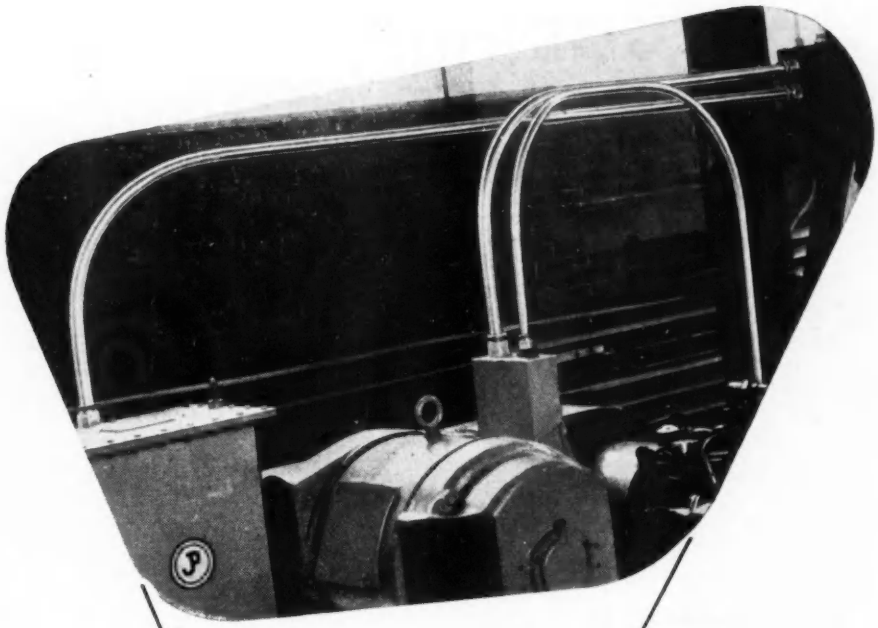

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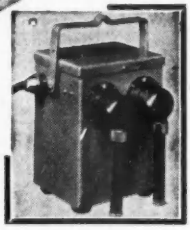

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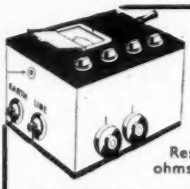

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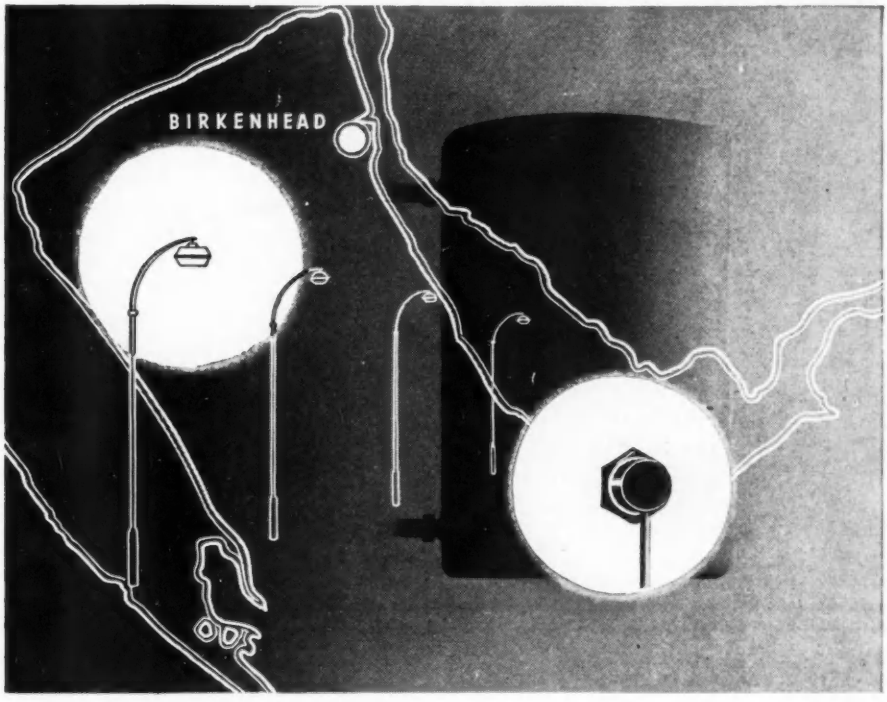


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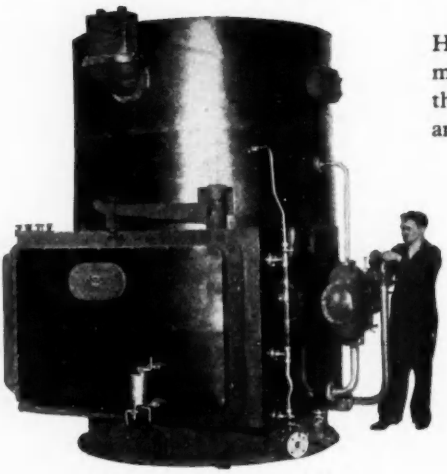

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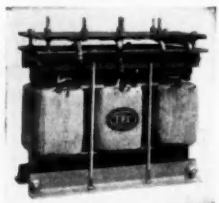

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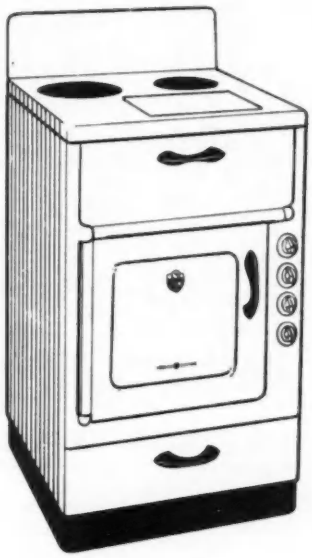

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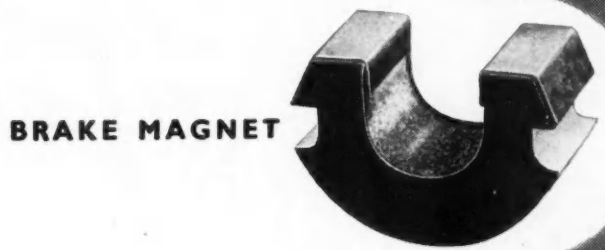

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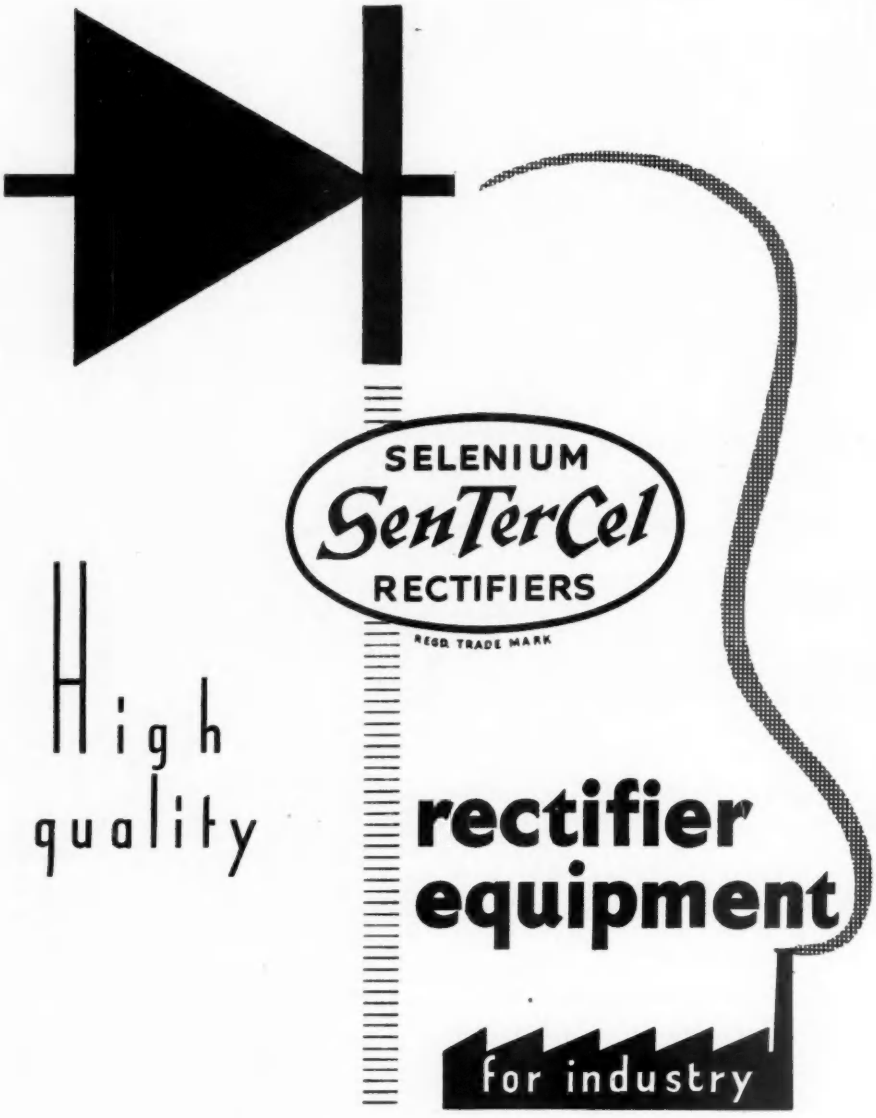


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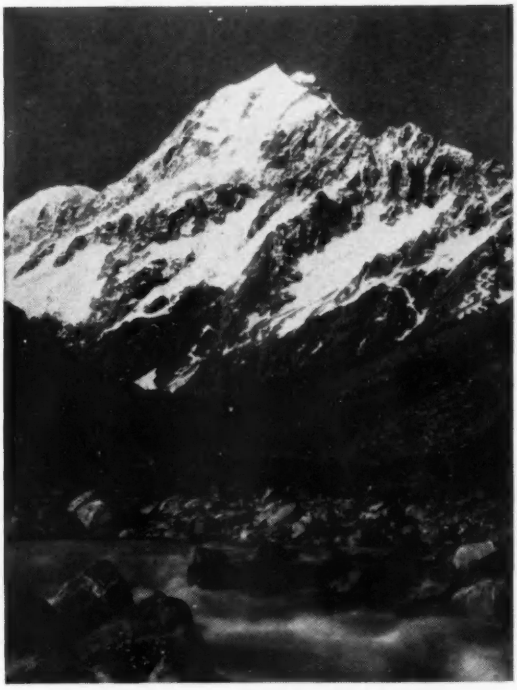

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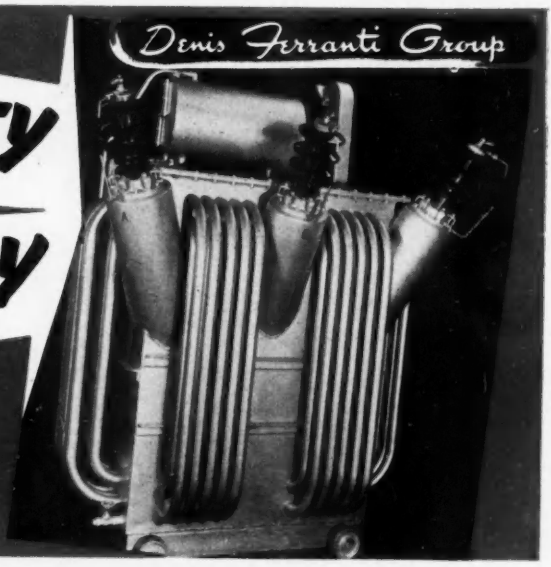


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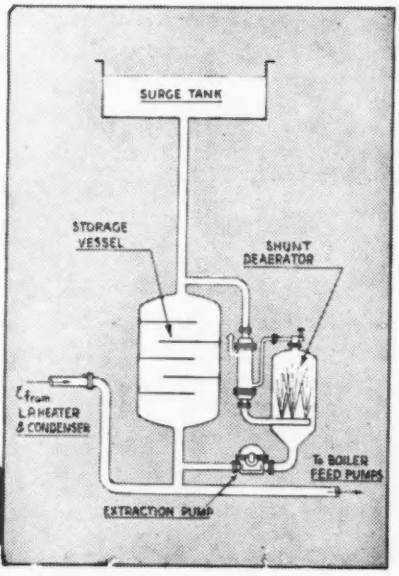


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